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BitStorm 1900™ Access Multiplexer

Installation and Maintenance Guide

Rev. 1.50
Publication Date: November 2001



Elastic Networks

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Initial document release.

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Revised release to include 6224 CO Modem Card, additional cable pin-out information, and mounting options.

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Revised release to include updated BS1900 System specifications, Power Card specifications, updated cable graphics and cable specifications, added 6306 Multicast Operation, AC Fan Tray specifications, CD Fan Tray Filter specifications, VLAN Operation, Same Card Broadcast, updated Privacy Management feature information, SNMP Functionality and Provisioning, SNMP MIBs , and new documentation formatting.

November 2001

Revised release to include 10 MB CO modem cards: 10306 and 10224, updated cable information, power specifications, and new DoCs.

About this Document

Focus

This document contains the complete installation and maintenance procedures for the BitStorm 1900™ Access Multiplexer shelf.

Audience

This document is intended for installation technicians charged with installing and maintaining the BitStorm 1900 Access Multiplexer in an Elastic Networks EtherLoop system.

Documentation References

Other supporting documentation for the BitStorm 1900 includes:

- 08-01137-01 (StormPort 400), 08-01143-01 (StormPort 600), ***StormPort™ Modem Installation Guide***. This document covers the installation of Elastic Networks StormPort modems as customer-premise equipment in an Elastic Networks EtherLoop system.
- 08-01016-01-300, ***YesWare™ Applications Users Guide***. This document covers the physical installation and initial network configuration setup of the BitStorm Server unit.
- 08-01024-01, ***StormTracker™ - Site Manager and Administration User's Guide***. This document covers the applications used to provision and manage an EtherLoop system using the BitStorm Server.
- 08-01019-01, ***StormTracker™ - Spectrum Manager User Guide***. This document covers spectral compatibility and debug/monitor functionality.

Conventions

The following conventions have been used in preparing this documentation.

Safety Labels

Throughout this documentation the following labels will be displayed to indicate safety issues. Make sure to read the labels carefully to ensure your own personal safety as well as that of equipment and customer services.



CAUTION: POSSIBLE SERVICE INTERRUPTION! This label means there is a possibility of interruptions in service.



WARNING: POSSIBLE EQUIPMENT DAMAGE! This label means there is a possibility of damage to company equipment.



WARNING: ELECTROSTATIC DISCHARGE! This label means there is a possibility of damage to company equipment by electrostatic discharge (ESD).



DANGER: POSSIBLE PERSONAL INJURY! This label means there is a possibility of personal bodily injury.

Software Steps and Procedures

- Text you are required to type or enter will appear in the document as follows:

<ENTER>, Name, <Tab>, programs\seven\aa1

- Text displayed on a computer screen will appear as follows:

“From the *HyperTerminal* window, select *File/Properties*, then select the *Settings* tab.”

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1 BitStorm 1900 Access Multiplexer

Introduction

The BitStorm 1900 utilizes patented EtherLoop™ Intelligent Ethernet technology to provide a robust platform that supports lifeline Plain Old Telephone Service (POTS) in addition to a variety of new revenue-generating services ranging from simple high-speed Internet access to advanced quality video conferencing, multi-stream Video On Demand (VOD), IP multicast video, and toll-quality Voice over IP (VoIP).

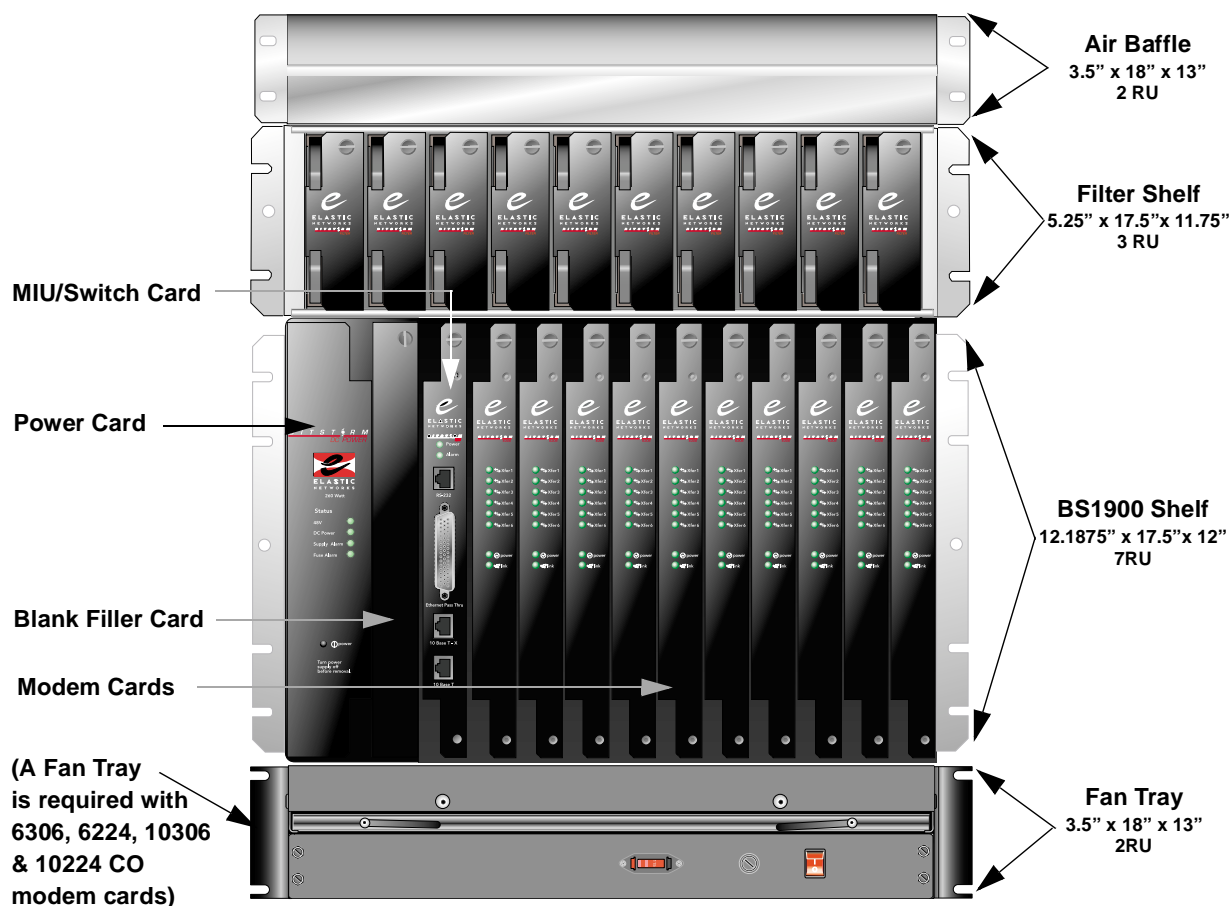
The BitStorm 1900 Access Multiplexer functions as an Internet Protocol Digital Subscriber Line Access Multiplexer (IP DSLAM) that directs IP data traffic flow between StormPort CPE modems and a data network. The BitStorm 1900 is the backbone component of an Ether-Loop, Intelligent Ethernet™-on-the-Loop, system. Supporting Storm-Port CPE modems in voice/data or data-only applications, the multiplexer is located in the communications room or telco.

Product Overview

The BitStorm 1900 System Components

The basic BitStorm 1900 System includes the BS1900 Shelf (with circuit packs), Air Baffle, Filter Shelf (s), and a Fan Tray. Depending on the application, multiple components may be installed and/or omitted in each rack.

Figure 1-1, “BitStorm 1900 Access Multiplexer Shelf with Cards and Components,” on page 2 shows the BitStorm 1900 shelf with the modem cards and basic components installed.

Figure 1-1: BitStorm 1900 Access Multiplexer Shelf with Cards and Components

BitStorm 1900 Shelf

The powerfully compact BitStorm 1900 Shelf supports 60 to 240 Ether-Loop lines. Each BS1900 Shelf contains 13 card slots housing the following circuit packs:

- Ten (10) BitStorm Multiplexer Modem Cards
- Management Interface Unit (MIU) or Switch Card
- Power Card
- Blank Filler Card*

* The blank filler card is used whenever a fan tray is needed to keep the air flowing properly through the unit. Blank filler cards are also used in any empty card slots to keep the BS1900 shelf free of dust and to provide proper air flow.

The BitStorm 1900 shelf and components are installed in a standard 19" rack and can be installed in 23" racks using optional 23" mounting ears. Up to five (5) BS1900 Systems can be installed into one rack depending on the application and the associated required components. Refer to *"Appendix B: Cabling Specifications," on page 143* for typical rack configurations.

Depending on the application/configuration, the following components are installed in the rack with the BitStorm 1900 Shelf to comprise the system:

Air Baffle

The Air Baffle, installed above the Filter Shelf (or the BitStorm 1900 Shelf), is used to deflect the exhaust air flow out the rear of the rack. When more than one BS1900 system is installed in a rack, the Air Baffle prevents the heated exhaust air of one BS1900 system from being drawn into the Fan Shelf of the BS1900 system installed above.

Fan Tray

The Fan Tray Shelf provides forced-air cooling throughout the BS1900 system. A Fan Tray is installed under each BS1900 Shelf and contains six forced-air cooling fans to ensure sufficient cooling for the entire system. The -48 V DC Fan Tray is ideal for the CO (Central Office) and the 110/220 V AC Fan Tray has been uniquely designed for enterprise applications. Fan Trays are not required in 4212 only configurations as the power supply is a lower wattage.

Filter Shelf Option

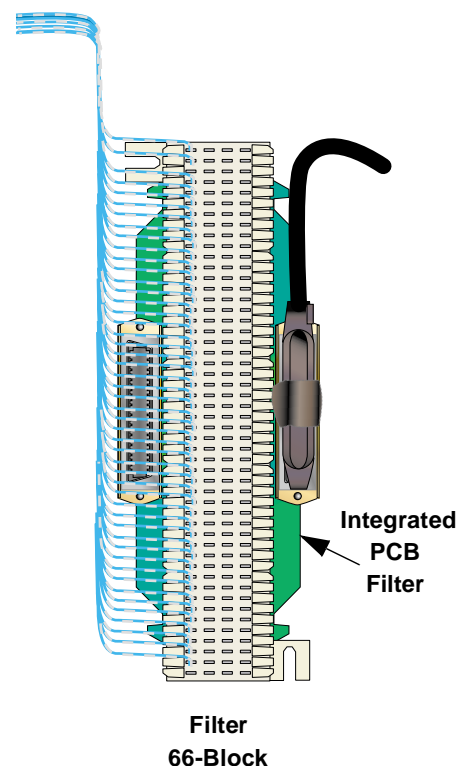
The Filter Shelf contains low-pass filter cards to separate out-of-voice-band signals from the voiceband traffic between the BitStorm modems and the external voice facility equipment. Filter shelves contains one filter card for each modem card installed in the BS1900 shelf (up to 10). Depending on the application, more than one Filter Shelf can be installed, one top of another.

The following table provides information on some common configurations and the number of Filter Shelves required for each installation.

Configuration	Number of Filter Shelf
4212 CO Modem Cards	1 Filter Shelf
6224 CO Modem Cards	2 Filter Shelves
6306 CO Modem Cards	1/2 Filter Shelf (5 filter cards)
10224 CO Modem Cards	2 Filter Shelves
10306 CO Modem Cards	1/2 Filter Shelf (5 filter cards)
Each Filter Shelf can filter up to 120 lines and requires 3RU of rack space.	

Filter 66-Block Option

The Filter 66-Block provides the same function as the Filter Shelf, however, it is a space saving and economical alternative to the Filter Shelf. Using the latest technology from Excelsus Technologies, the Filter 66-Block integrates a 66-Block with a PCB (Printed Circuit Board) Filter, eliminating the need for a Filter Shelf, saving rack space and reducing the number of cables necessary for the installation. Each Filter 66-Block can filter up to 24 lines.



The following table compares the number of BS1900 systems that can be installed into a standard 7' rack using the Filter Shelf or Filter 66-Block options:

Configuration	Number of BS1900 Systems Installed in a Rack with Optional Filter Shelf	Number of BS1900 Systems Installed in a Rack with Optional Filter 66-Block
4212 CO Modem Cards	4	5
6306 CO Modem Cards	3	4
6224 CO Modem Cards	3	5
10306 CO Modem Cards	3	4
10224 CO Modem Cards	3	5

The remainder of this Chapter covers features of the BitStorm System and the CO modem card and component specifications. For further technical information on the BitStorm 1900 System, refer *Appendix A* section entitled, "*BS1900 System Specifications*," on page 134 for detailed information.

CO Modem Cards

One BitStorm 1900 shelf supports up to 10 modem cards. Each CO modem card controls the StormPort CPE modems, directing data traffic flow between the CPE modems and the data network.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

The following CO modem cards are available:

- **4212 CO modem card** - 12-port statistically multiplexed, 4 Mbps
- **6306 CO modem card** - 6-port dedicated, 6 Mbps
- **6224 CO modem card** - 24-port statistically multiplexed, 6 Mbps
- **10306 CO modem card** - 6-port dedicated, 10 Mbps
- **10224 CO modem card** - 24-port statistically multiplexed, 10 Mbps

Table 1-1: CO Modem Card LEDs

LED	Color
Power	Green when power is on
Transfer	Green when data transfer is normal (blinks when training to find correct speed)
Link	Green when network is in normal operation (amber while training, or network is down)

Privacy Management

The Privacy Management (a.k.a. MAC Address Filtering) feature ensures the privacy of each user connected to a local layer 2 network. The Site Manager software is used to enter the MAC address of a gateway or router to connect to the internet or a local server in the StormPort CPE modem Privacy Management filter table. The Privacy Management ensures that downstream packets are discarded unless

they are from one of the MAC addresses in the filter table and upstream packets are discarded unless they are going to one of the MAC addresses in the filter table. Thus, it is impossible for a user connected to one CPE modem to see another user on the same local L2 network connected to another CPE modem, unless the user's computer's MAC address is entered into the Privacy Management filter table.

NOTE: Creating a filter table on a 4212/6224/10224 CO modem affects all EtherLoop ports on that card and one of its CPEs is redundant, but possible. However, the CO table should be the same or be a superset of the CPE table.

Same Card Broadcast

The Same Card Broadcast feature is an option on CO modems that should be used in conjunction with Privacy Management to provide secure communications (default is Disabled):

Refer to *Table 1-2, "Same Card Broadcast Feature Enabled/Disabled Function for CO Modems,"* for the feature function and security issue associated with each setting..

Table 1-2: Same Card Broadcast Feature Enabled/Disabled Function for CO Modems

CO Modem	Enabled/ Disabled	Feature Function	Security
4212	Enabled	Allows the 12 clients on the same card to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same card from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other cards can see each other unless Privacy Management is used.
6306	Enabled (Default)	Allows clients on circuits 1, 2, 3 or circuits 4, 5, 6 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-three from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-three or other cards can see each other unless Privacy Management is used.

Table 1-2: Same Card Broadcast Feature Enabled/Disabled Function for CO Modems

CO Modem	Enabled/Disabled	Feature Function	Security
6224	Enabled (Default)	Allows clients on circuits 1-12 or circuits 13-24 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-12 from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-12 or other cards can see each other unless Privacy Management is used.
10306	Enabled (Default)	Allows clients on circuits 1, 2, 3 or circuits 4, 5, 6 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-three from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-three or other cards can see each other unless Privacy Management is used.
10224	Enabled (Default)	Allows clients on circuits 1-12 or circuits 13-24 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-12 from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-12 or other cards can see each other unless Privacy Management is used.

The Same Card Broadcast feature is selected from StormTracker Site Manager and the modems are recognized as having the feature enabled or disabled.

Spectrum Manager ADSL Protect

The enhanced Spectrum Manager software makes EtherLoop™ spectrally compatible with asymmetrical services such as ADSL, G. Lite, and the 1-Meg Modem, detecting and protecting against interference within the same binder. In addition, EtherLoop in its native state is spectrally compatible with symmetrical digital services such as T1, HDSL, HDSL2, or SDSL.

Spectrum Manager operates under five modes of operation:

Mode	Description
Native	EtherLoop operates without the analysis of other service activity in the individual loops.
Monitor	Spectrum Manager analyzes other services in the loop that may limit EtherLoop performance.
Forced	EtherLoop provides optimum spectrally compatible performance with asymmetric services in the individual loop that may temporarily affect EtherLoop's upstream capability. In this mode, EtherLoop is forced to "mimic" asymmetric DSL.
Auto-Protect	EtherLoop operates in an Asymmetric Mode if asymmetric interferers are present. EtherLoop returns to normal upstream operations once the interference is gone.
Video Protect	EtherLoop operates in a forced Asymmetric Mode with guaranteed high downstream bandwidth for the delivery of streaming video applications.

Spectrum Manager-Video Protect

The Spectrum Manager-Video Protect activates the EtherLoop asymmetrical operation with all upstream traffic limited to a training speed of 16 (1.8Mbps) on the BitStorm 6306 and 10306 CO modems. Downstream traffic continues to run as fast as the loop conditions allow. When this feature is enabled all nearby EtherLoop lines running high-speed video downstreams are protected. All CO modems at a site are required to have the feature enabled by StormTracker Site Manager or EMS via the MIU SNMP agent.

Passes VLAN Tagged Frames

The BitStorm 1900 is capable of passing 802.1Q tagged Ethernet frames of 1522 bytes. To implement a VLAN solution, a 802.1Q tagging switch must exist upstream. Also, an 802.1Q tagging switch or device must be present on the customer end of the CPE modem.

WAN Interface Cards

The BitStorm 1900 supports two (2) types of WAN interfaces:

- **MIU (Management Interface Card)** - supports 4212, 6306, 6224, 10306, and 10224 modem cards
- **Switch Card** - supports 4212 modem cards

MIU SNMP Functionality

The MIU provides remote monitoring and configuration functionality via SNMP (Simple Network Management Protocol). Through the SNMP agent, users can remotely manage and configure modem settings and monitor the performance statistics of all modems in the BitStorm 1900 system.

The MIU SNMP agent supports the SNMPv1/RFC 1157 protocol and supports RFC 1213 MIB II interface groups and the RFC 1493 Bridge MIB. The MIU SNMP agent also includes an Elastic Networks' Ether-Loop private MIB. In order to manage the SNMP agent, the user must load the Elastic Networks' private MIB into the user's SNMP Network Manager using the procedure accompanying the specific Network Management Software (i.e., HP Openview, etc.).

A list of all supported MIBs and the Elastic Networks' private MIB can be found in "*Appendix C: SNMP MIBs*," on page 163 of this document. Elastic Networks' private MIBs can be downloaded from the Elastic Networks ftp site. Contact the Elastic Networks Customer Satisfaction organization for instructions on how to access the FTP site. (Refer to *Table 4-1, "Customer Satisfaction Contact Information,"* on page 131.)

Mixing CO Modem Cards

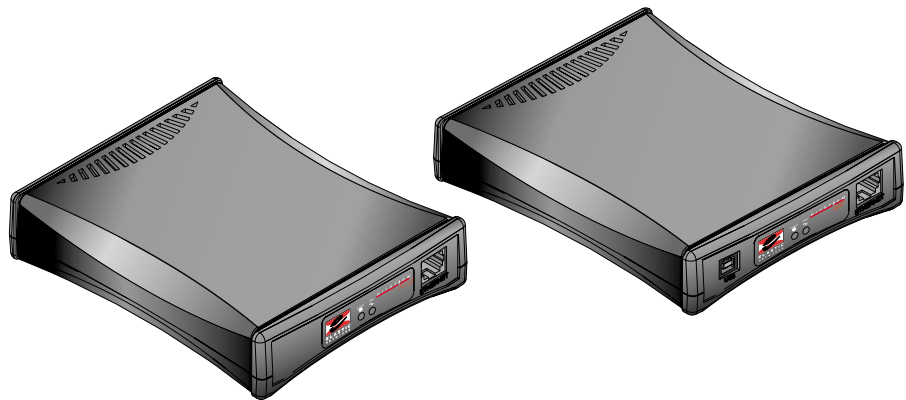
When using an MIU, it is possible to fill a BitStorm 1900 shelf with different modem cards (i.e., two 4212 CO modem cards, four 6306 or 10306 CO modem cards, and four 6224 or 10224 CO modem cards). However, if a Switch Card is used instead of an MIU, only 4212 CO modem cards can be installed in the BitStorm 1900 shelf. Switch cards only support the 4212 modems.

For the 6306 and 10306 CO modem cards, Spectrum Manager includes a Video Protect mode that protects EtherLoop heavy downstream traffic from disrupting upstream traffic on adjacent EtherLoop lines.

NOTE: The BitStorm 1900 Access Multiplexer CO modem card ports are provisioned in the CO & CPE Add/Search functions of the Database module in the StormTracker Site Manager application. With an MIU, the modem database is auto-provisioned, identifying the physical shelf slot location of each modem.

StormPort CPE Modems

The BitStorm 1900 system supports Elastic Network's CPE (customer-premise equipment) StormPort 400, 600, 610, 620, and 1020 modems.



NOTE: The StormPort 1020 CPE modem works at full 10 Mbps capacity with the 10306 or 10224 CO modems.

4 Mbps CO Modem Card Specifications

4212 CO Modem Card

The 4212 CO modem card provides 12 statistically multiplexed Ether-Loop lines sharing a single 4 Mbps modem. *Figure 1-2, "BitStorm 1900 with 4212 CO Modem Cards (Part #:01-30067-01)," on page 13* shows the 4212 CO modem cards with a Switch Card, however, they can operate with an MIU as well.

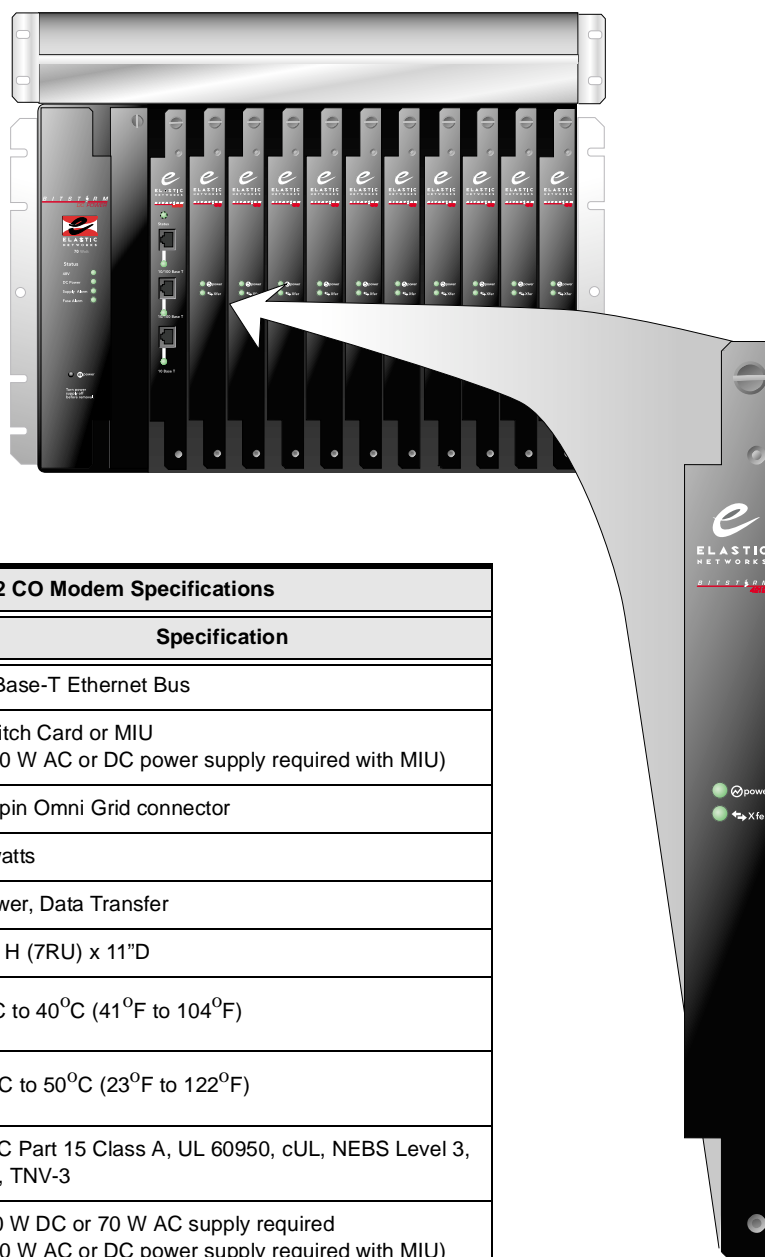
NOTE: When the 4212 CO modem card is used with an MIU card that passes the Ethernet interface, the external Ethernet Switch must be set to 10 Mbps, Full Duplex. Auto Detection will not operate properly.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Special Features

- Same Card Broadcast
- Activate/De-activate Etherloop Ports
- Privacy Management
- Spectrum Manager - ADSL Protect

Figure 1-2: BitStorm 1900 with 4212 CO Modem Cards (Part #:01-30067-01)

4212 CO Modem Specifications	
Description	Specification
Shelf Interface	10Base-T Ethernet Bus
WAN Interface	Switch Card or MIU (260 W AC or DC power supply required with MIU)
Line Interface	35-pin Omni Grid connector
Heat Dissipation	6 watts
LEDs	Power, Data Transfer
Card Dimensions	12" H (7RU) x 11"D
Operation Temperature	5°C to 40°C (41°F to 104°F)
Short-term Operating Temperature	-5°C to 50°C (23°F to 122°F)
Certifications	FCC Part 15 Class A, UL 60950, cUL, NEBS Level 3, CE, TNV-3
Power Supply	250 W DC or 70 W AC supply required (260 W AC or DC power supply required with MIU)
Fan Tray	<ul style="list-style-type: none"> A fan tray is not required with a Switch Card configuration An AC fan tray air filter frame must be installed without an air filter for AC MIU configurations A DC fan tray with an air filter installed is required for NEBS compliant DC MIU configurations

Table 1-3: System Power Specifications with 4212 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/Fan Tray	Max Current
AC	Switch card with 70 W AC power supply	4212*	120	90	0.8	no fan tray req'd	.8
DC	Switch card with 250 W DC power supply	4212*	120	90	0.8	no fan tray req'd	1.9
DC	MIU with 260 W DC power supply	4212*	120	90	0.8	135	2.8
AC	MIU with 260 W AC power supply	4212*	120	90	.8	195	1.8

* Configuration assumes 10 modems cards are used.

6 Mbps CO Modem Card Specifications

6306 CO Modem Card

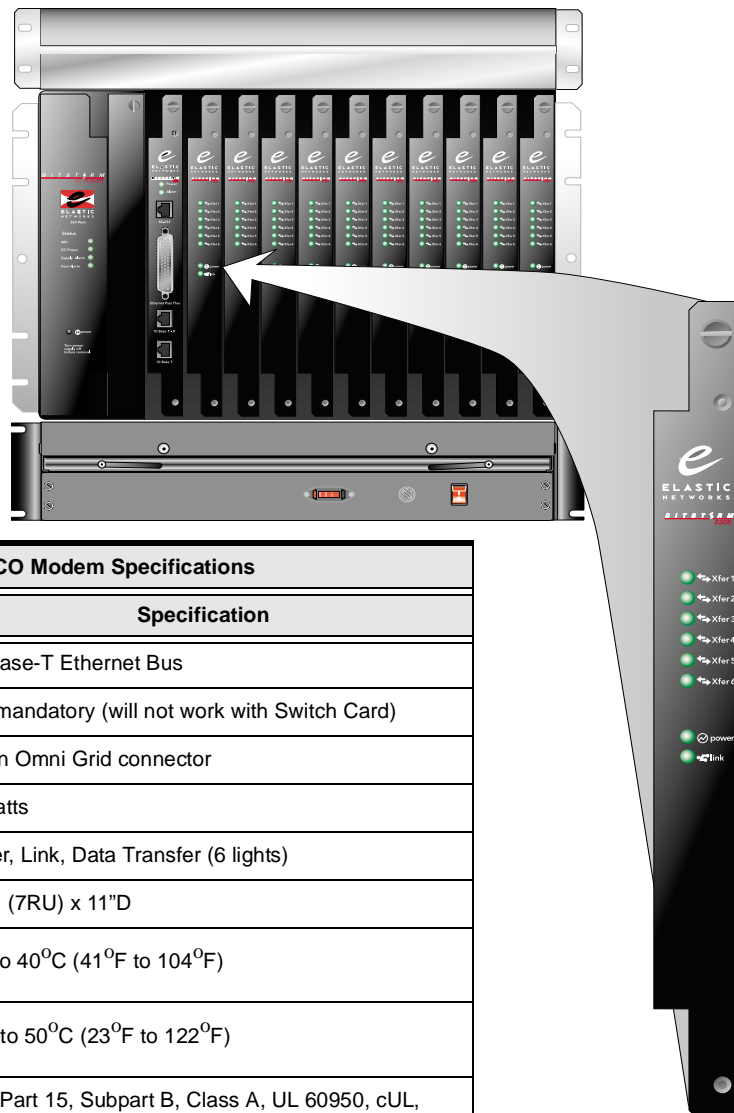
The 6306 CO modem card provides six EtherLoop lines, each with its own dedicated 6 Mbps modem.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Special Features

- Same Card Broadcast
- Spectrum Manager - ADSL Protect
- Spectrum Manager - Video Protect
- Privacy Management
- IP Multicast Operation

Figure 1-3: BitStorm 1900 with 6306 Modem Cards (Part #: 01-00058-01)

6306 CO Modem Specifications	
Description	Specification
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU mandatory (will not work with Switch Card)
Line Interface	35-pin Omni Grid connector
Heat Dissipation	22 watts
LEDs	Power, Link, Data Transfer (6 lights)
Card Dimensions	12" H (7RU) x 11"D
Operation Temperature	5°C to 40°C (41°F to 104°F)
Short-term Operating Temperature:	-5°C to 50°C (23°F to 122°F)
Certifications	FCC Part 15, Subpart B, Class A, UL 60950, cUL, NEBS Level 3, CE, TNV-3, ETSI
Power Supply	260 W DC or 260 W AC
Fan Tray	Mandatory, use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply <ul style="list-style-type: none"> An AC fan tray air filter frame must be installed without an air filter for AC MIU configurations A DC fan tray with an air filter installed is required for NEBs compliant DC MIU configurations

Table 1-4: System Power Specifications with 6306 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/FanTray	Max Current
DC	MIU with 260 W DC power supply	6306*	60	260	4.4	305	6.4
AC	MIU with 260 W AC power supply	6306*	60	230	3.8	335	3.1

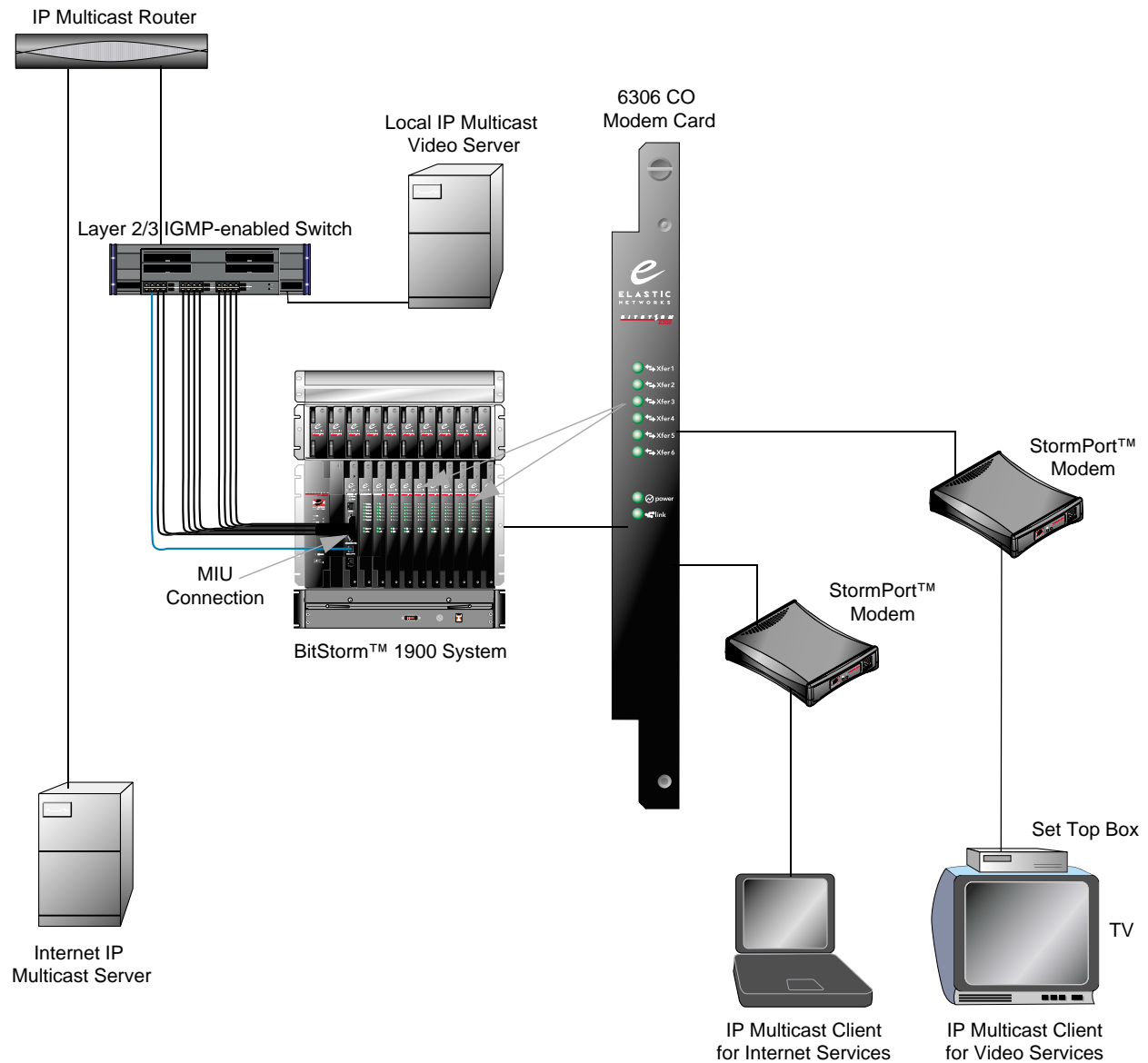
* Configuration assumes 10 modems cards are used.



WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

6306 CO Modem IP Multicast Operation

An optional feature of the 6306 CO modem card is the ability to pass IP Multicast traffic only to the subscribing port. The 6306 modem card functions as a multi-layer switch and supports IGMP v1/v2 when connected to the MIU (Management Interface Unit) card via the 100 Base-T Ethernet backplane connection. The 6306 modem creates Port Table data when a client joins a multicast group and forwards the IGMP message upstream through the MIU to an IGMP-enabled Switch. When the IP Multicast data is streamed back to the 6306, it replicates and forwards the IP Multicast streams **ONLY** to the ports with subscribing clients.

Figure 1-4: 6306 IP Multicast Operation

The 6306 IP Multicast Operation works in the following manner:

1. The client issues an IGMP Join Request (Unsolicited report) Layer 2 broadcast.
2. The 6306 modem listens for any IGMP packets (IGMP snooping) and maintains a table mapping the IP Multicast stream to the port.
3. The 6306 forwards the IGMP Join Request upstream through the MIU to the IGMP-enabled switch.

4. The IGMP-enabled Switch “snoops” for the IGMP messages and builds a mapping of IP Multicast streams to its Ethernet port interfaces.
5. The Switch forwards the IGMP report on behalf of the IP Multicast client to the upstream Multicast Router
6. The Multicast Router utilizes a multicast routing protocol (such as MOSPF, DVMRP, etc.) to route available multicast streams.
7. Once the IP Multicast stream is received at the IGMP-enabled Switch, it replicates and forwards the packets on all ports with active members of that IP Multicast group.
8. The 6306 replicates and forwards IP Multicast streams ONLY to the ports with subscribing clients.
9. When the member clients issues an IGMP Leave, the 6306 receives that message, forwards it to the upstream IGMP-enabled Switch, and then generates a series of “quick query” packets on the downstream port (default response time of 100 milliseconds, repeated 3 times.) This query will allow the 6306 modem to determine if there are any remaining client members of the IP Multicast group being left on that port, such as a second set-top box. If no IGMP Group Membership response is received, the 6306 modem will update the IP Multicast bridge table and no longer forward that IP Multicast stream to that port.
10. The query response time value and number of quick queries sent are provisionable parameters, and can be adjusted to better interoperate with a variety of client devices, such as IP television set-top boxes. Refer to the *StormTracker-Site Manager and Administration User Guide* for more information.
11. The 6306 modem relies on an upstream IGMP enabled router or switch to send Group Membership query messages.

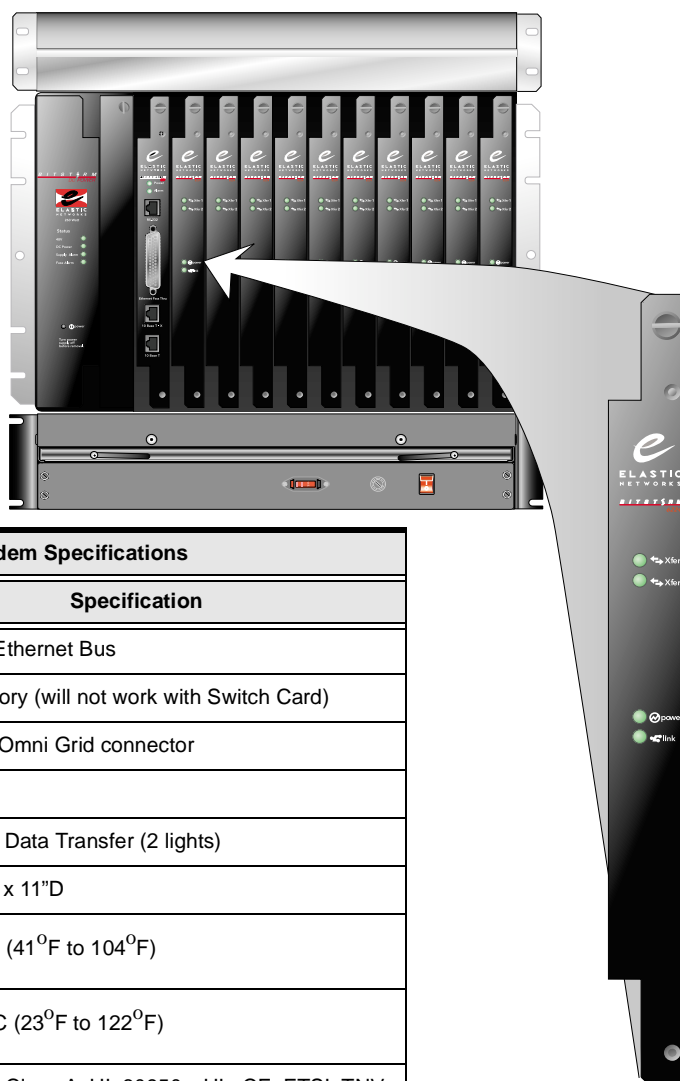
6224 CO Modem Card

The 6224 CO modem card provides 24 statistically multiplexed Ether-Loop lines; 12 per single 6 Mbps modem.

NOTE: The 6224 is recommended for use on loops up to 6000' long.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To
comply with Telcordia GR-1089-CORE,
Outside Plant Voltage/Current Limiting
Protection is required for each Outside Plant
Exposed line.

Figure 1-5: BitStorm 1900 with 6224 Modem Cards (Part #: 01-00092-01)

6224 CO Modem Specifications	
Description	Specification
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU mandatory (will not work with Switch Card)
Line Interface	Dual 35-pin Omni Grid connector
Heat Dissipation	12 watts
LEDs	Power, Link, Data Transfer (2 lights)
Card Dimensions	12" H (7RU) x 11"D
Operation Temperature	5°C to 40°C (41°F to 104°F)
Short-term Operating Temperature:	-5°C to 50°C (23°F to 122°F)
Certifications	FCC Part 15 Class A, UL 60950, cUL, CE, ETSI, TNV-3
Power Supply	260 W DC or 260 W AC
Fan Tray	Mandatory , use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply <ul style="list-style-type: none"> An AC fan tray air filter frame must be installed without an air filter for AC MIU configurations A DC fan tray with an air filter installed is required for DC MIU configurations

Table 1-5: System Power Specifications with 6224 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/Fan Tray	Max Current
DC	MIU with 260 W DC power supply	6224*	240	160	0.7	205	4.3
AC	MIU with 260 W AC power supply	6224*	240	150	0.6	255	2.3

* Configuration assumes 10 modems cards are used.

10 Mbps CO Modem Card Specifications

10306 CO Modem Card

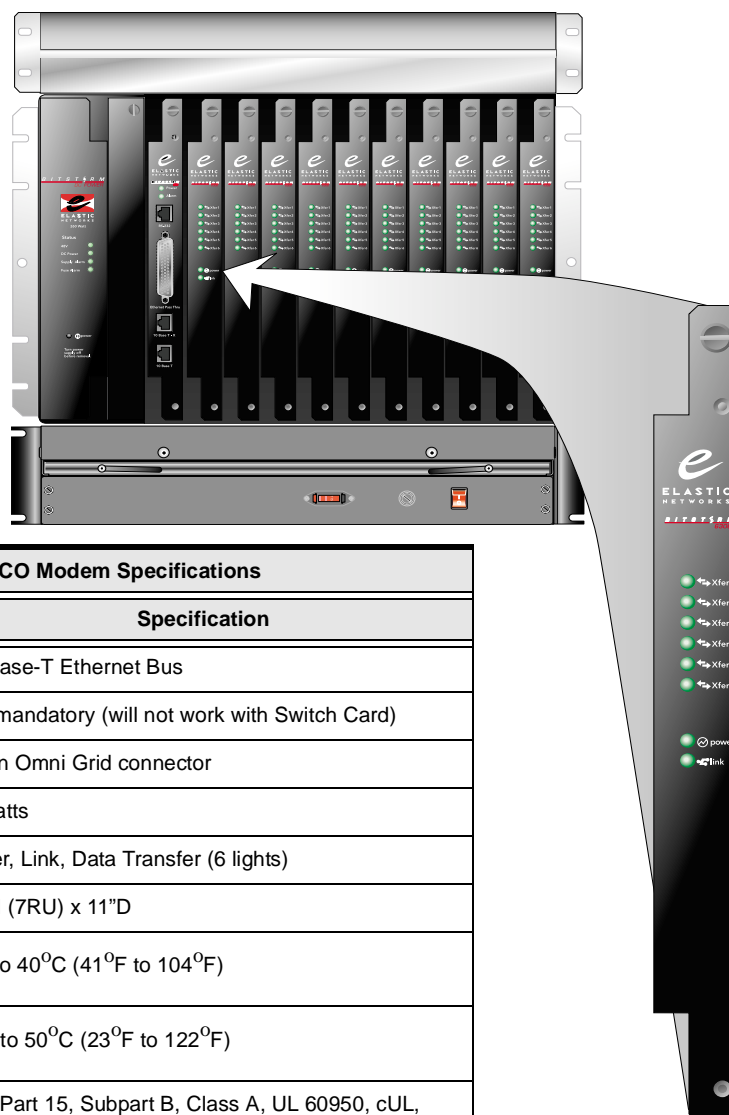
The 10306 CO modem card provides six EtherLoop lines, each with its own dedicated 10 Mbps modem.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Special Features

- Same Card Broadcast
- Spectrum Manager - ADSL Protect
- Spectrum Manager - Video Protect
- Privacy Management
- IP Multicast Operation

Figure 1-6: BitStorm 1900 with 10306 Modem Cards (Part #: 01-00153-01)

10306 CO Modem Specifications	
Description	Specification
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU mandatory (will not work with Switch Card)
Line Interface	35-pin Omni Grid connector
Heat Dissipation	22 watts
LEDs	Power, Link, Data Transfer (6 lights)
Card Dimensions	12" H (7RU) x 11"D
Operation Temperature	5°C to 40°C (41°F to 104°F)
Short-term Operating Temperature:	-5°C to 50°C (23°F to 122°F)
Certifications	FCC Part 15, Subpart B, Class A, UL 60950, cUL, NEBS Level 3 (pending), CE, TNV-3, ETSI
Power Supply	260 W DC or 260 W AC
Fan Tray	Mandatory, use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply <ul style="list-style-type: none"> An AC fan tray air filter frame must be installed without an air filter for AC MIU configurations A DC fan tray with an air filter installed is required for NEBs compliant DC MIU configurations

Table 1-6: System Power Specifications with 10306 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/FanTray	Max Current
DC	MIU with 260 W DC power supply	10306*	60	260	4.4	305	6.4
AC	MIU with 260 W AC power supply	10306*	60	230	3.8	335	3.1

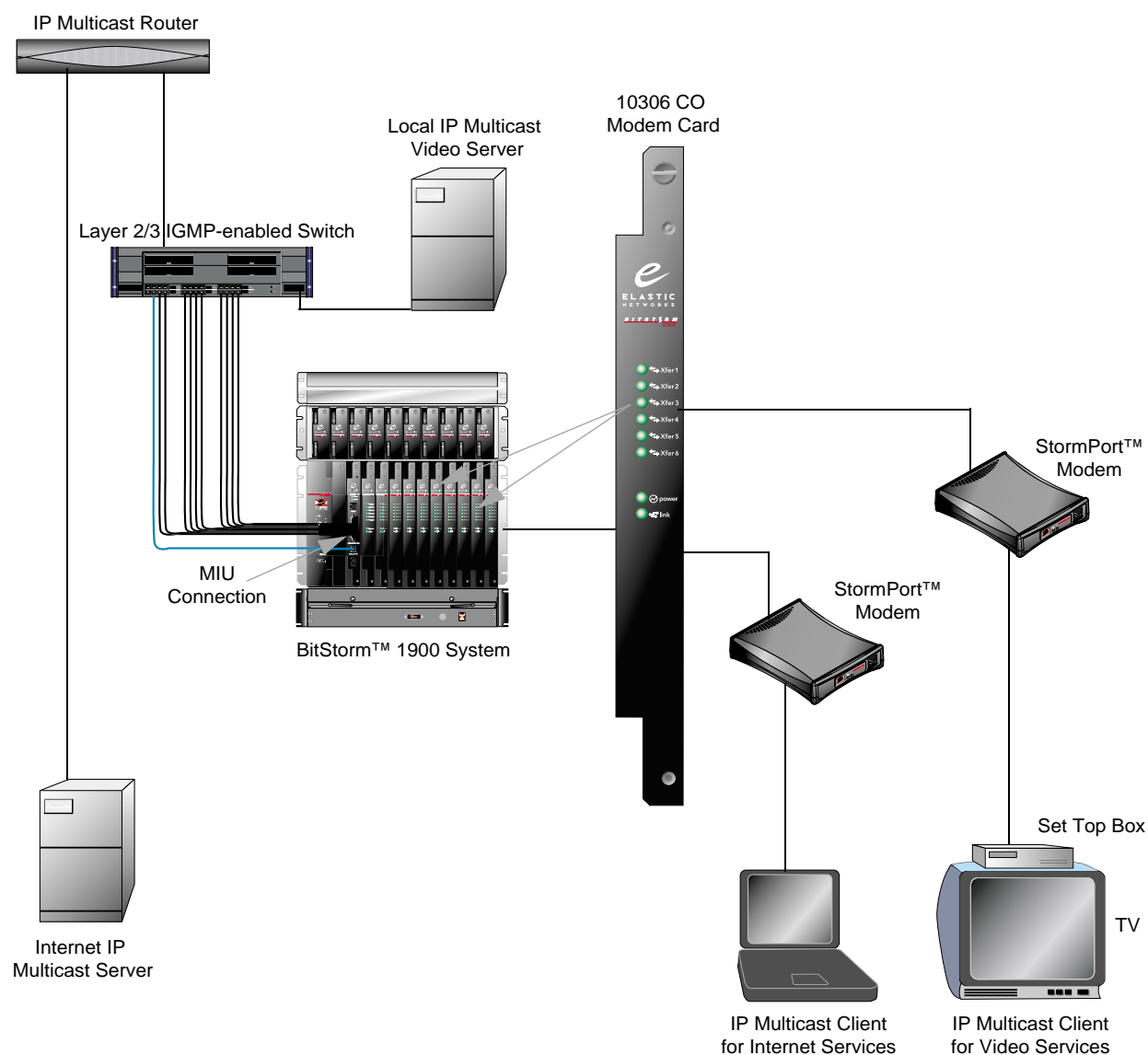
* Configuration assumes 10 modems cards are used.



WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. **DO NOT** install an air filter for the AC Fan Tray, only the frame.

10306 CO Modem IP Multicast Operation

An optional feature of the 10306 CO modem card is the ability to pass IP Multicast traffic only to the subscribing port. The 10306 modem card functions as a multi-layer switch and supports IGMP v1/v2 when connected to the MIU (Management Interface Unit) card via the 100 Base-T Ethernet backplane connection. The 10306 modem creates Port Table data when a client joins a multicast group and forwards the IGMP message upstream through the MIU to an IGMP-enabled Switch. When the IP Multicast data is streamed back to the 10306, it replicates and forwards the IP Multicast streams **ONLY** to the ports with subscribing clients.

Figure 1-7: 10306 IP Multicast Operation

The 10306 IP Multicast Operation works in the following manner:

1. The client issues an IGMP Join Request (Unsolicited report) Layer 2 broadcast.
2. The 10306 modem listens for any IGMP packets (IGMP snooping) and maintains a table mapping the IP Multicast stream to the port.
3. The 10306 forwards the IGMP Join Request upstream through the MIU to the IGMP-enabled switch.

4. The IGMP-enabled Switch “snoops” for the IGMP messages and builds a mapping of IP Multicast streams to its Ethernet port interfaces.
5. The Switch forwards the IGMP report on behalf of the IP Multicast client to the upstream Multicast Router
6. The Multicast Router utilizes a multicast routing protocol (such as MOSPF, DVMRP, etc.) to route available multicast streams.
7. Once the IP Multicast stream is received at the IGMP-enabled Switch, it replicates and forwards the packets on all ports with active members of that IP Multicast group.
8. The 10306 replicates and forwards IP Multicast streams ONLY to the ports with subscribing clients.
9. When the member clients issues an IGMP Leave, the 10306 receives that message, forwards it to the upstream IGMP-enabled Switch, and then generates a series of “quick query” packets on the downstream port (default response time of 100 milliseconds, repeated 3 times.) This query will allow the 10306 modem to determine if there are any remaining client members of the IP Multicast group being left on that port, such as a second set-top box. If no IGMP Group Membership response is received, the 10306 modem will update the IP Multicast bridge table and no longer forward that IP Multicast stream to that port.
10. The query response time value and number of quick queries sent are provisionable parameters, and can be adjusted to better interoperate with a variety of client devices, such as IP television set-top boxes. Refer to the *StormTracker-Site Manager and Administration User Guide* for more information.
11. The 10306 modem relies on an upstream IGMP enabled router or switch to send Group Membership query messages.

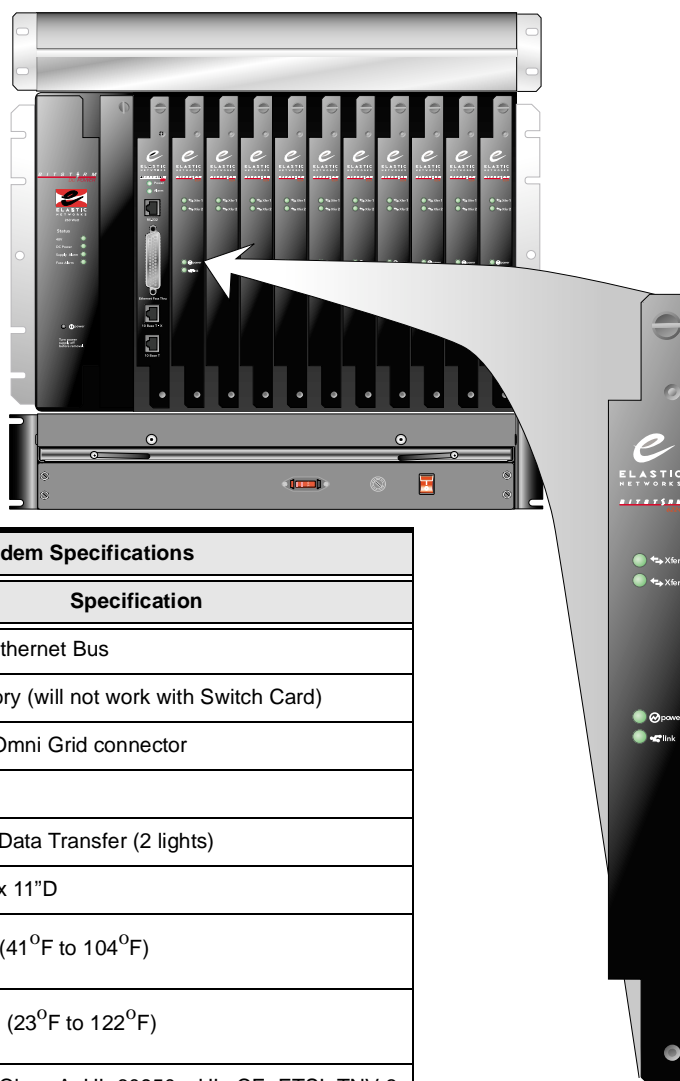
10224 CO Modem Card

The 10224 CO modem card provides 24 statistically multiplexed Ether-Loop lines; 12 per single 10 Mbps modem.

NOTE: The 10224 is recommended for use on loops up to 6000' long.



WARNING: POSSIBLE EQUIPMENT DAMAGE! To
comply with Telcordia GR-1089-CORE,
Outside Plant Voltage/Current Limiting
Protection is required for each Outside Plant
Exposed line.

Figure 1-8: BitStorm 1900 with 10224 Modem Cards (Part #: 01-00164-01)

10224 CO Modem Specifications	
Description	Specification
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU mandatory (will not work with Switch Card)
Line Interface	Dual 35-pin Omni Grid connector
Heat Dissipation	12 watts
LEDs	Power, Link, Data Transfer (2 lights)
Card Dimensions	12" H (7RU) x 11"D
Operation Temperature	5°C to 40°C (41°F to 104°F)
Short-term Operating Temperature:	-5°C to 50°C (23°F to 122°F)
Certifications	FCC Part 15 Class A, UL 60950, cUL, CE, ETSI, TNV-3
Power Supply	260 W DC or 260 W AC
Fan Tray	Mandatory , use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply <ul style="list-style-type: none"> An AC fan tray air filter frame must be installed without an air filter for AC MIU configurations A DC fan tray with an air filter installed is required for DC MIU configurations

Table 1-7: System Power Specifications with 10224 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/Fan Tray	Max Current
DC	MIU with 260 W DC power supply	10224*	240	160	0.7	205	4.3
AC	MIU with 260 W AC power supply	10224*	240	150	0.6	255	2.3

* Configuration assumes 10 modems cards are used.

WAN Interface Card Specifications

The BitStorm 1900 system supports two (2) types of WAN interfaces, the MIU (Management Interface Unit) and the Switch Card.

MIU (Management Interface Unit)

The MIU is the recommended WAN interface for the BitStorm 1900™ Access Multiplexer. Seated next to the modem cards, the MIU processes Ethernet traffic and manages modems. The MIU provides powerful management capabilities including SNMP and the flexibility of mixing and matching modem cards for varied configurations.

NOTE: The MIU works *only* with the 260 W power supply.

The primary functions of the MIU are Ethernet Pass Thru and Modem Management/Auto-Discovery/Auto-Provisioning. When initialized, the MIU automatically discovers and auto-provisions modems, on its shelf, by writing a Shelf ID for each modem card in the shelf via an out-of-band I²C configuration channel. Thereafter, the assigned modems will only respond to commands from the associated MIU via the in-band Ethernet connection.

Modem parameters can also be set in the *Add/Search* modem links of the *Database* module in Site Manager.

The MIU communicates with the Site Manager or EMS, via TCP/IP, which extends the flexibility of remote equipment location(s) and network management. Each MIU requires only one IP address (the MIU IP address) to manage all modems within a shelf. The MIU uses the Modem Daemon protocol to communicate directly with EtherLoop CO and CPE modems.

An SNMP agent has been incorporated into the MIU which allows SNMP PC programs such as Elastic Networks' *EMS 2.0* or *Castle Rock's SNMPc* to manage the MIU and Etherloop modems. The SNMP MIBs including MIB II RFC 1213 and the Etherloop MIB are listed in "Appendix C: SNMP MIBs," on page 163 of this document, and are available from Elastic Network's Customer Satisfaction organization. Refer to Table 4-1, "Customer Satisfaction Contact Information," on page 131.

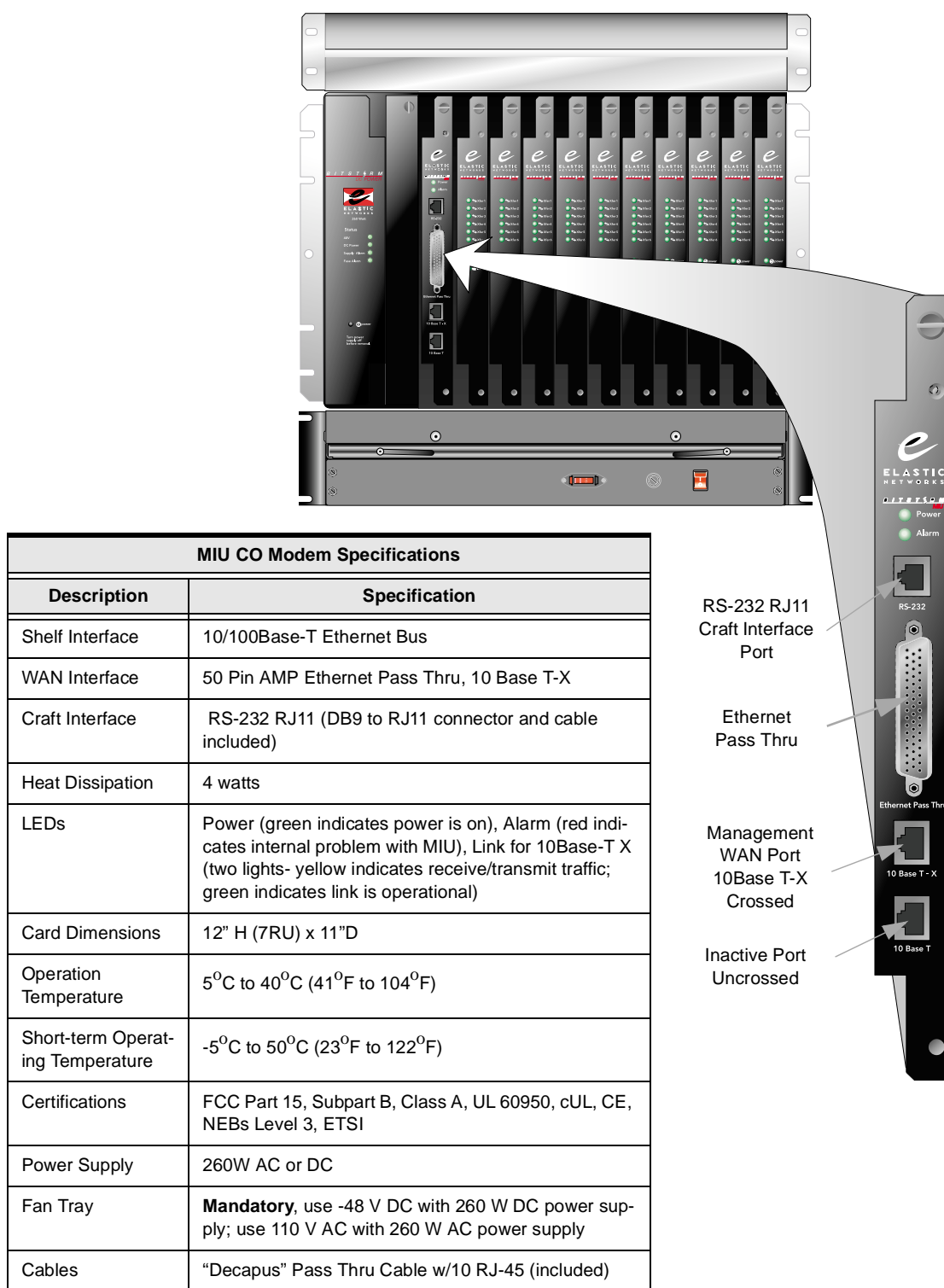
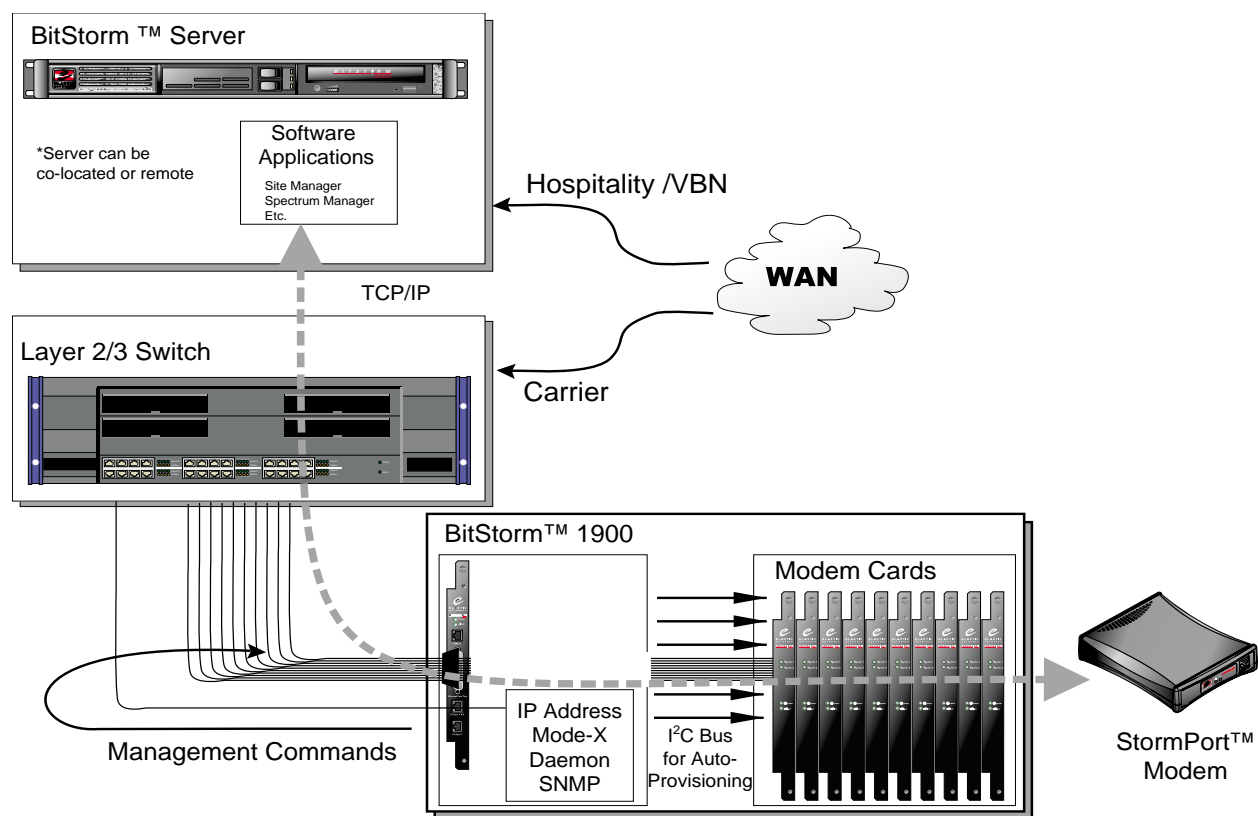
Figure 1-9: BitStorm 1900 with MIU (Part #: 01-00075-01) and 6306 CO Modems

Figure 1-10: MIU Data Connection

Switch Card

The BitStorm Switch Card (installed next to the modem cards) is a WAN interface that aggregates the Ethernet traffic generated by the 4212 stat-mux modem cards and passes it to the local Ethernet data network.



CAUTION: POSSIBLE SERVICE INTERRUPTION! Only 4212 CO Modem Cards can be used with the Switch Card.

The Switch card has three external Ethernet ports on the front faceplate of the card. The top two Ethernet up-link ports are auto sensing 10/100Base-T ports (uncrossed). These ports are used to connect the BitStorm 1900™ Access Multiplexer shelf to the data network and to interconnect or "stack" shelves in a multi-shelf bay, sharing the 100Base-T connection. The bottom Ethernet port is a 10Base-T port (crossed) used for local craft access to the shelf.

NOTE: The 70 W AC or 250 W DC power card must be used with a Switch card.

When using the Switch Card, the Site Manager software must either be on the same LAN segment, or each CO and CPE modem must have an IP address for Modex Daemon extents to operate.



CAUTION: POSSIBLE SERVICE INTERRUPTION! The BitStorm 1900 Access Multiplexer may lock up if both uplink ports are connected to the same router or switch.

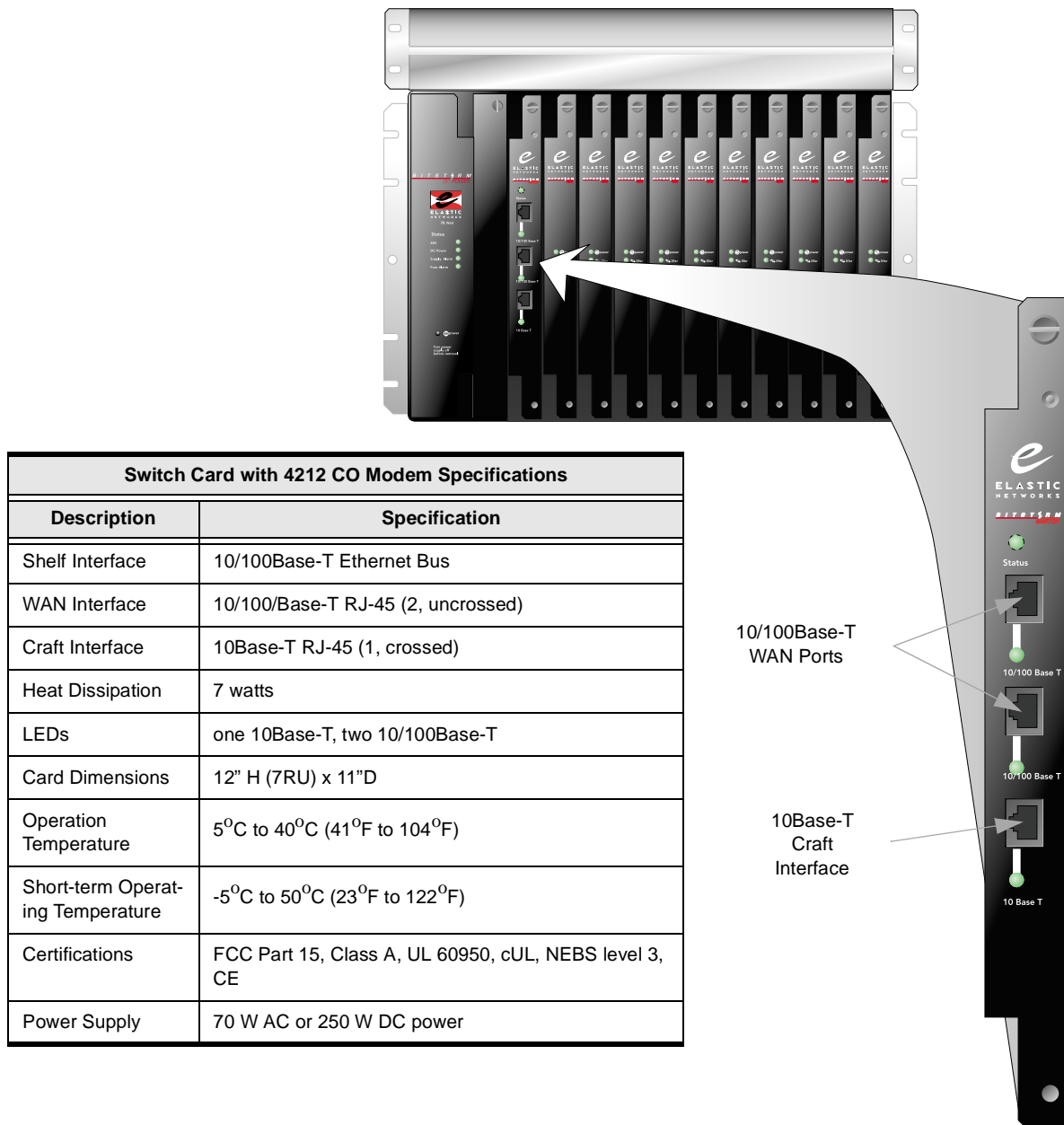
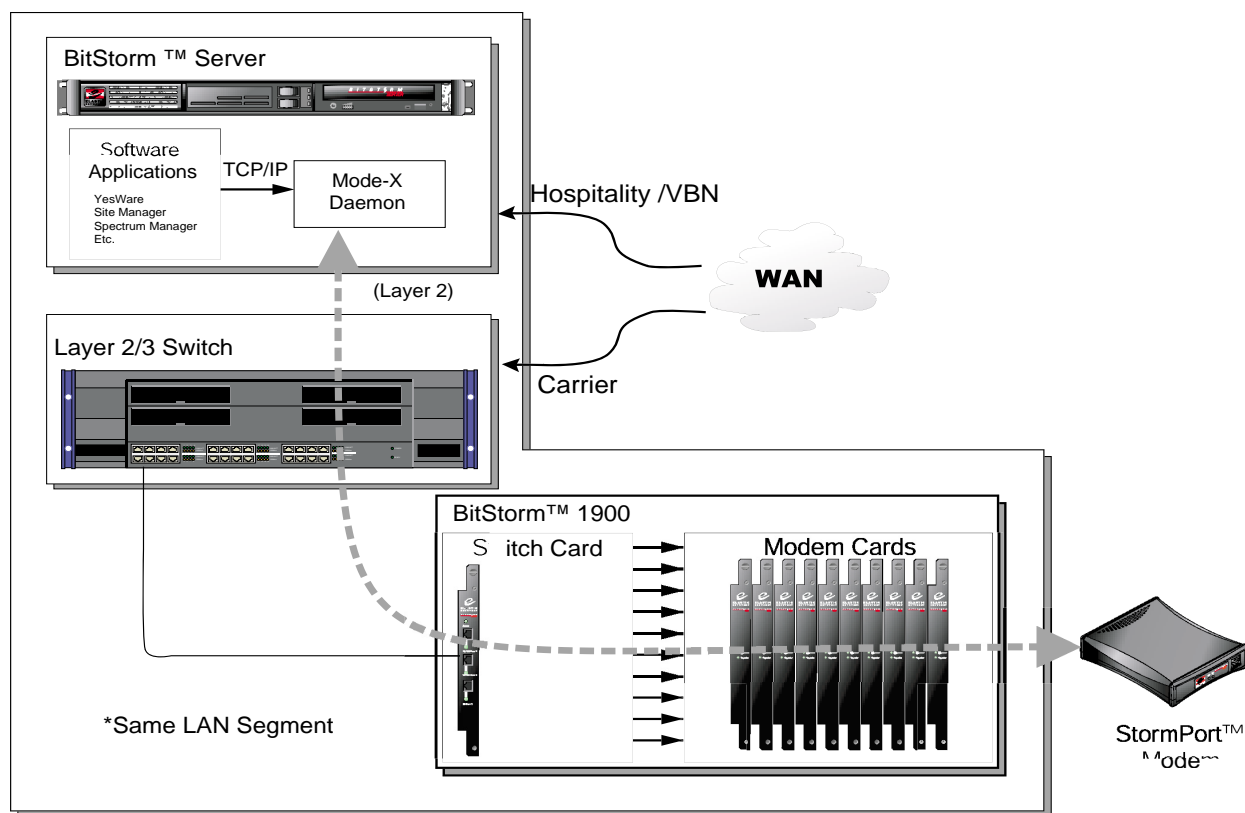
Figure 1-11: BitStorm 1900 with Switch Card (Part #: 01-30011-01) and 4212 CO Modems

Figure 1-12: Switch Card Data Connection



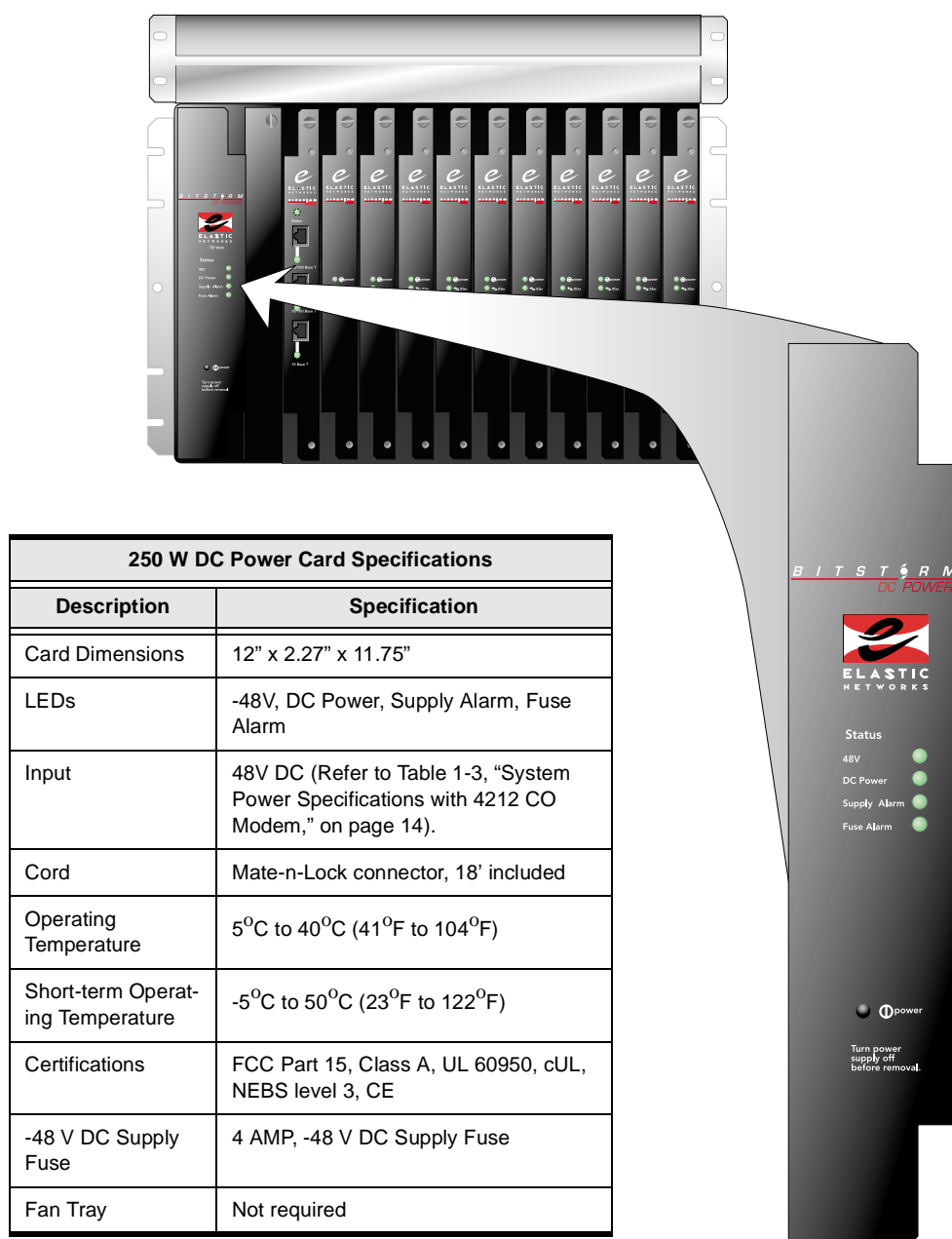
Power Card Specifications

The power cards convert the power feeds to the +12, +5, +3.3, -5 and +2.5 V DC power levels used by the BitStorm 1900 components.

250 W DC

The 250 W DC power card converts the -48 V DC power feed to the power levels used exclusively by the 4212 CO modem card and Switch Card.

Application: Used exclusively for the 4212 system with DC power supply.

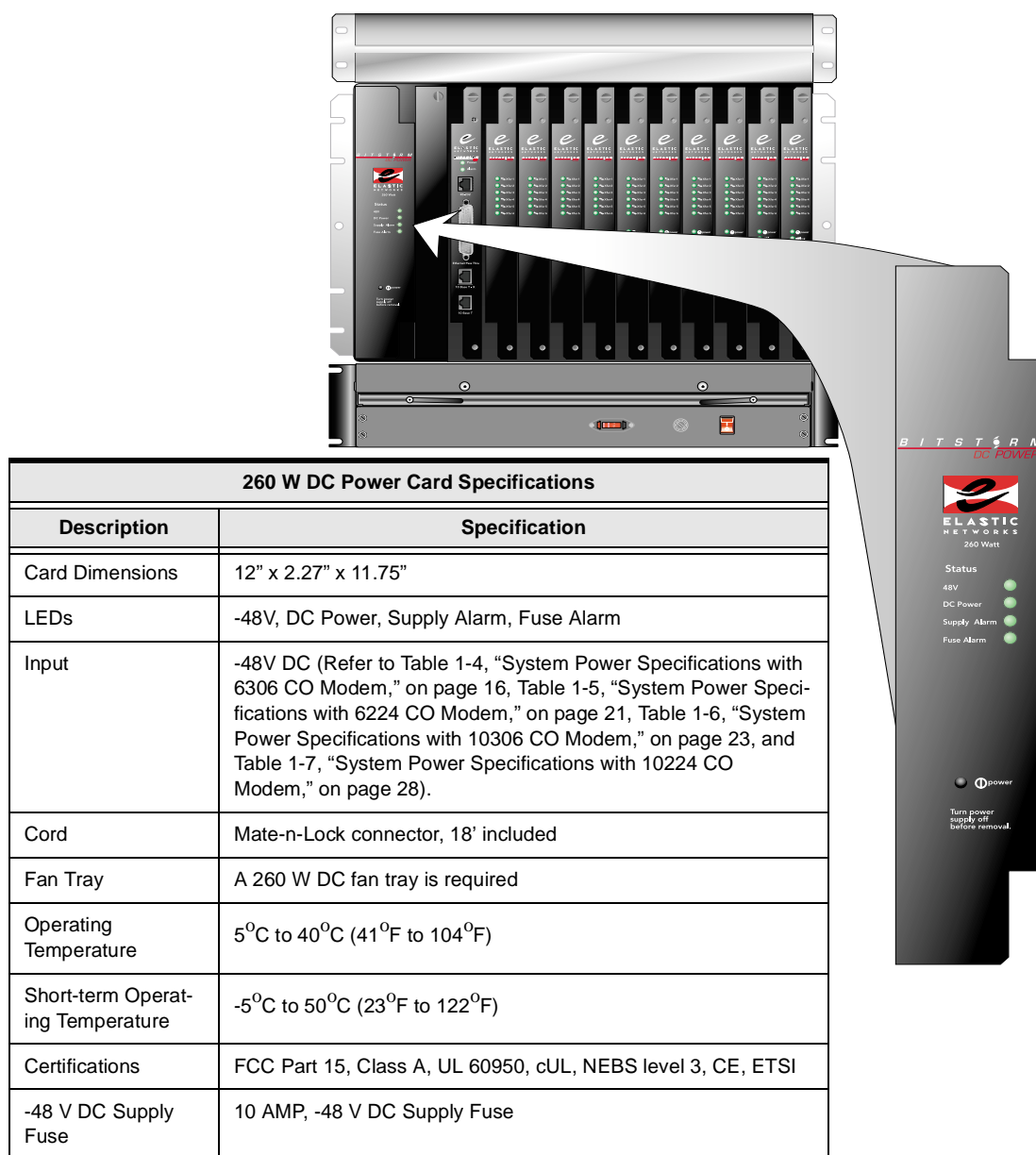
Figure 1-13: 250 W DC Power Card (Part #: 01-30013-01)

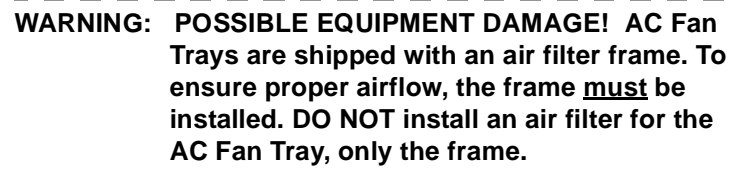
260 W DC

The 260 W DC power card converts the -48 V DC power feed to the power levels used by the 4212, 6306, 6224, 10306, and 10224 CO modem cards.

Application: The 260 W DC power card is required for the 6306, 6224, 10306, and 10224 CO modem cards and MIU.

Figure 1-14: 260 W DC Power Card (Part #: 01-00080-01)



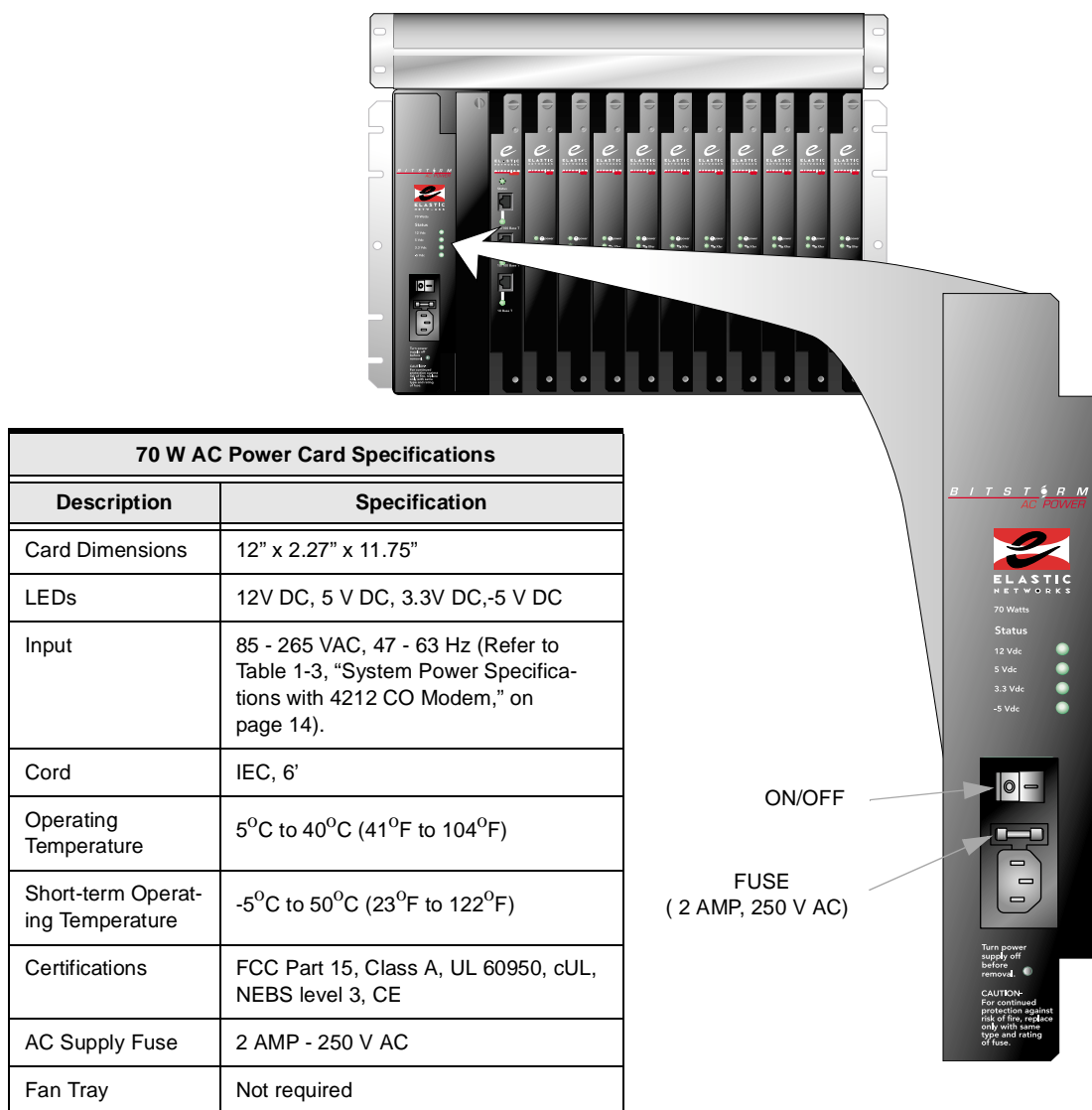


70 W AC

The 70 W AC power card converts the 110/220 V AC power feed to the power levels used by 4212 CO modem cards and a Switch Card.

Application: Used exclusively for a 4212 system.

Figure 1-15: 70 W AC Power Card (Part #: 01-00060-01)



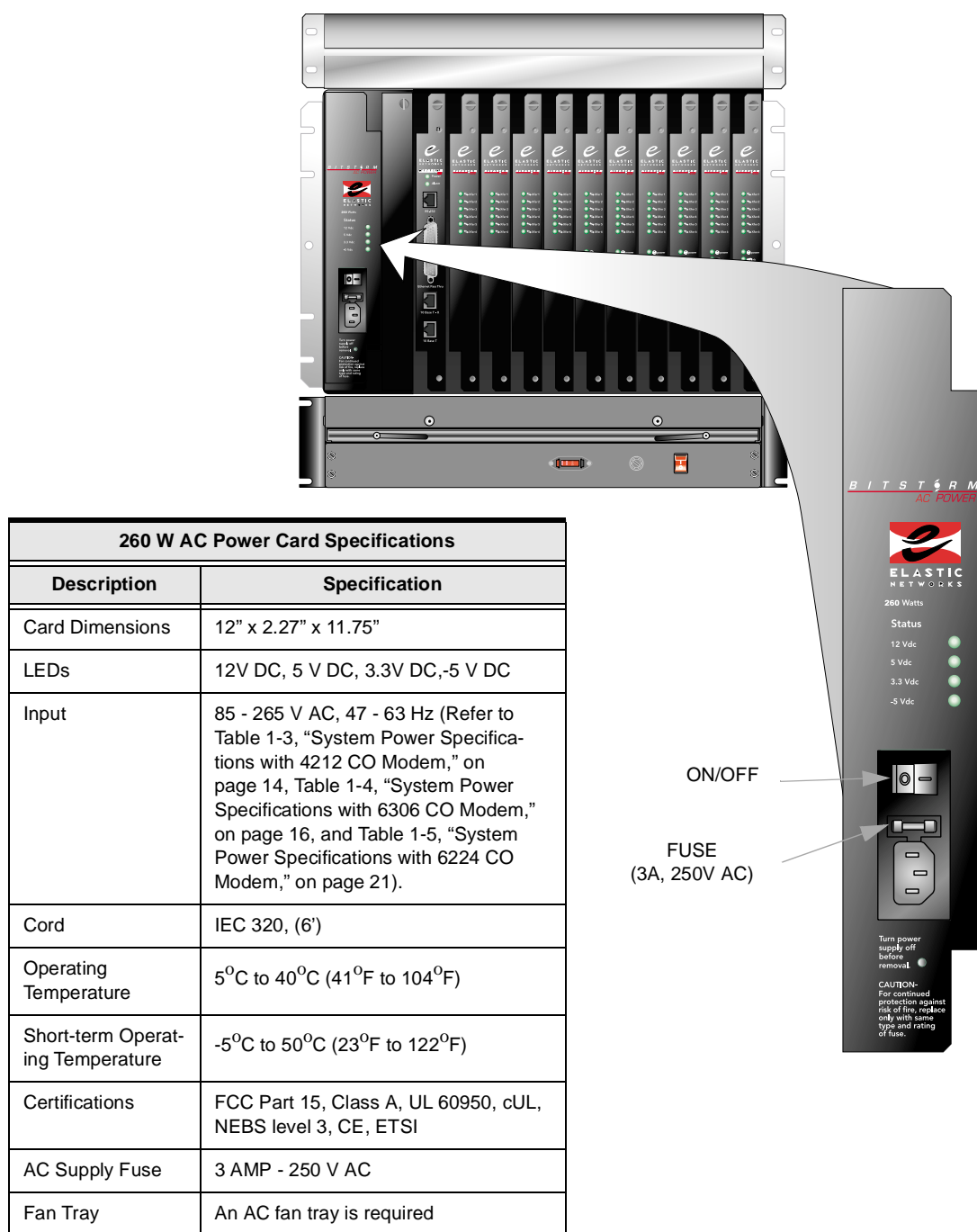
260 W AC



WARNING: POSSIBLE EQUIPMENT DAMAGE! MIU configuration only! DO NOT use the 260 W AC power supply with a Switch Card configuration.

The 260 W AC power card converts the 110/220 V AC power feed to the power levels used by the 4212, 6306, 6224, 10603, 10224 CO modem cards and the MIU.

Application: Required with 6306, 6224, 10306, and 10224 CO modem cards with AC power supply.

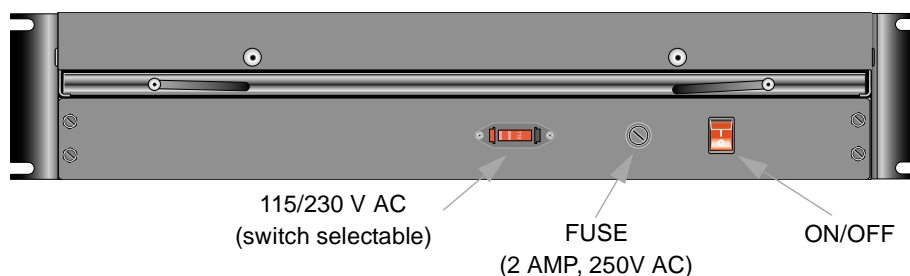
Figure 1-16: 260 W AC Power Card (Part #: 01-00079-01)

Fan Tray Specifications

The -48V DC fan tray and the 110/220V AC (switch selectable) fan tray are used with the BitStorm 1900™ Access Multiplexer in Ether-Loop applications to provide forced-air cooling in each chassis. A fan tray is *required* under each chassis that houses one or more 6306, 6224, 10306, or 10224 CO modem cards. Each fan tray is installed using 23" mounting ears.

Fan Tray 110/220 V AC

Figure 1-17: Fan Tray 110/220 V AC (Part #: 01-00084-02)



Fan Tray 110/220 V AC Specifications	
Operating Temperature	0°C to 40°C (0°F to 104°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Certifications	FCC part 15 Subpart B, Class B, UL 60950, cUL, CE
Power Consumption	105 W
Dimensions	3.5" x 18" x 13"
Filter (See Warning below)	For proper air flow install the air filter frame. DO NOT install an air filter with the frame.
Cord	IEC 320, 6'
AC Supply Fuse	2 AMP, 250 V AC



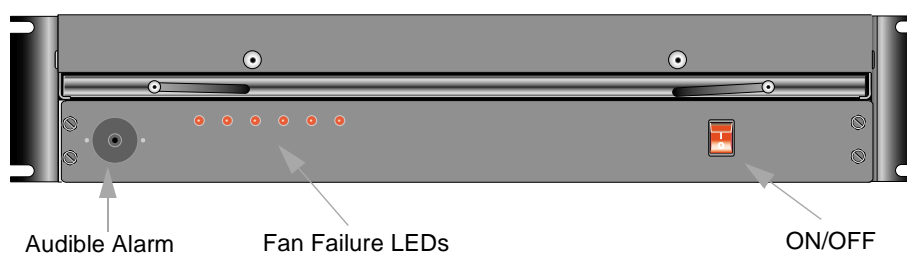
WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

Table 1-8: Power Specifications for the AC Fan Tray

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts per line	Watts w/fan tray	Max current
AC	AC Fan Tray	n/a	n/a	105	n/a	n/a	.9

Fan Tray -48 V DC

Figure 1-18: Fan Tray -48 V DC (Part #: 01-00084-01)



Fan Tray -48 V DC Specifications	
Operating Temperature	0°C to 40°C (0°F to 104°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Certifications	FCC part 15 Subpart B, Class B, UL 60950, cUL, NEBS Level 3 CE
Power Consumption	45W
Dimensions	3.5" x 18" x 13"
NEBS Air Filter	Change every 6 months
Cord	14-gauge stranded cable (not included)
-48 V DC Supply Fuse	2 AMP, -48 V DC Supply Fuse

Table 1-9: Power Specifications for the DC Fan Tray

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts per line	Watts w/fan tray	Max current
DC	DC Fan Tray	n/a	n/a	45	n/a	n/a	.9

Low-Pass Filter Specifications

Filter Shelf

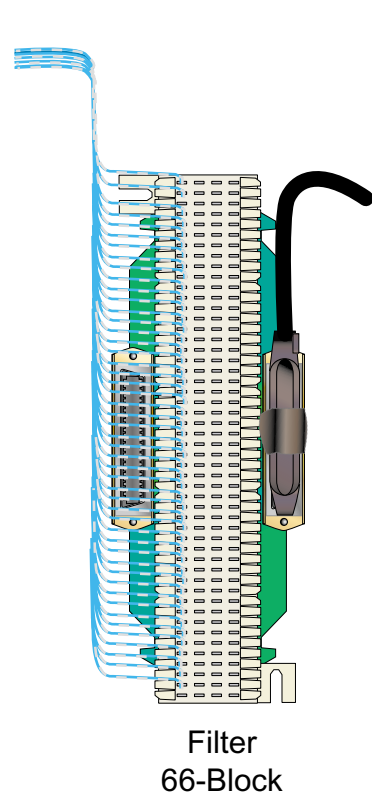
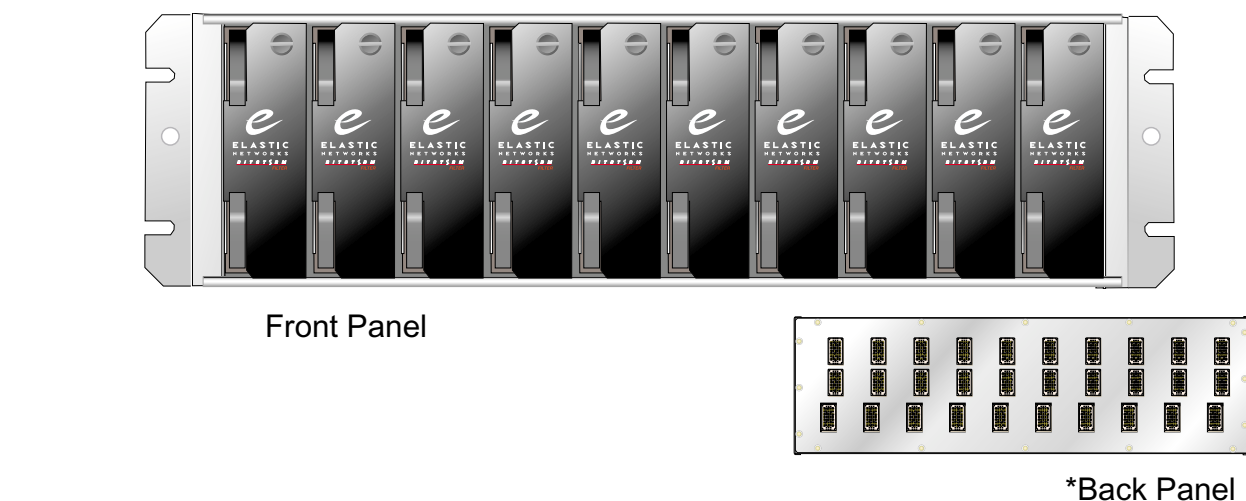
Low-Pass filters are used with the BitStorm 1900 in EtherLoop applications where voice service is required. The low-pass filter cards separate out-of-voiceband signals from the voiceband traffic between the BitStorm modems and the external voice facility equipment. The Low-Pass Filter Shelf contains one filter card for each modem card.

The filter shelf connects to the distribution frame, designed to minimize signal interference and facilitate broadband connectivity by isolating Digital Service Units (DSUs) from the Private Branch Exchange (PBX). Refer to *Figure 1-19 on page 46* for Filter Shelf Specifications.

Filter 66-Block

The Filter 66-Block provides the same function as the filter shelf, however, it is a space saving and economical alternative to the filter shelf for large enterprise installations. Refer to *Figure 1-19 on page 46* for Filter 66-Block Specifications.

Figure 1-19: Filter Shelf (Filter Shelf Part #: 01-20029-01, Filter Card Part #: 01-20029-01, and Filter 66-Block (Part #: 05-00021-01))



Filter Shelf Specifications	
Shelf Dimensions	5.25" x 17.5" x 11.75"
Card Dimensions	4.75" x 1.5" x 11.25"
Third-Order Low-Pass Filters	insertions loss < .5 dB to 12 kHz 60 kHz stop-band loss > 30 dB 100 Ohm return loss > 20 dB to 12 kHz
Certifications	UL 60950, cUL, NEBs Level 3, CE, ETSI
Connectors	10 Omni-Grid Connectors
Cables	Refer to <i>Appendix B: Cabling Specifications</i> .

Filter 66-Block Specifications*	
Dimensions	10" x 4.5" x 2.75"
Connectors	Amp Champ

* For more detailed specifications on the Filter 66-Block refer to the *Excelsus Technologies Spec Sheet* located on their website at excelsus-tech.com.

BitStorm 1900 Component Requirements

Table 1-10, “BitStorm 1900 Component Requirements,” provides the basis requirements for each component within the shelf.

Table 1-10: BitStorm 1900 Component Requirements

P.N	Shelf Components	4212 CO Modem Card	6306 CO Modem Card	6224 CO Modem Card	10306 CO Modem Card	10224 CO Modem Card	Special Instructions
01-30013-01	250 W DC power	Yes	No	No	No	No	
01-00080-01	260 W DC power	Optional	Yes	Yes	Yes	Yes	Must use fan tray* *air filter is required for NEBs compliance
01-00060-01	70 W AC power	Optional	No	No	No	No	
01-00079-01	260 W AC power	Optional	Yes	Yes	Yes	Yes	Must use MIU and fan tray <u>without</u> an air filter
01-30011-01	Switch Card	Yes	No	No	No	No	Cannot use Switch Card with 260 W power cards
01-00075-01	MIU	Optional	Yes	Yes	Yes	Yes	
01-00084-01	Fan Tray, DC	Optional	Yes	Yes	Yes	Yes	
01-00084-02	Fan Tray, AC	Optional	Yes	Yes	Yes	Yes	



WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.



WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

2 BitStorm 1900 Installation and Testing

The BitStorm 1900 provides EtherLoop CO modems, which communicate with the remote StormPort CPE modems installed at the customer premise. Installing the BitStorm 1900 consists of the following:

- Installing the BitStorm shelf and accessories into an equipment rack
- Connecting the BitStorm 1900 to the telephone line
- Installing the StormPort CPE modems
- Connecting the Ethernet data network

NOTE: In voice/data applications, the BitStorm 1900 shelf installation includes an auxiliary voiceband Filter Shelf or Filter 66-Block.

This chapter contains the procedures for installing and testing the mid-mount and flush-mount components of the BitStorm 1900.

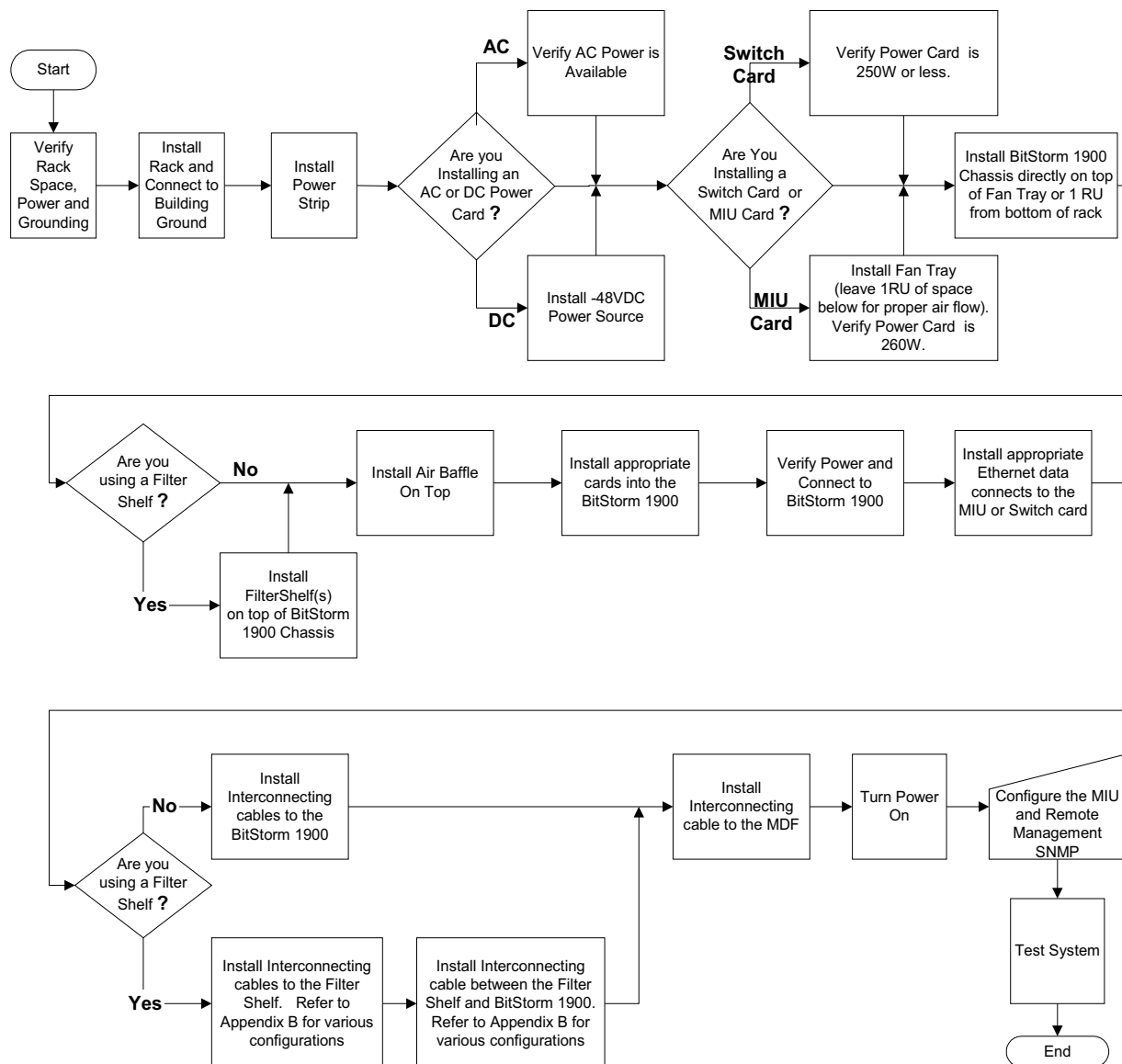


WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Installation Flow Chart

Figure 2-1, "BitStorm 1900 Installation Flow Chart," provides a visual flow chart of the BitStorm 1900 installation process as a reference tool.

Figure 2-1: BitStorm 1900 Installation Flow Chart



Installation Task List

The following is a complete list of all tasks to perform. To install the BitStorm 1900 complete each task in the order given.

Task # and Description	Page
Task 001: Pre-Installation Checklist	52
Task 002: Installing the 19" Fan Tray	54
Task 003: Installing the BS1900 and Filter Shelves	58
Task 004: Installing the Air Baffle	63
Task 005: Installing the Circuit Packs	64
Task 006: Connecting Power to the Shelf	65
Task 007: Installing the Data Network Connection with an MIU	70
Task 008: Installing the Data Network with a Switch Card	74
Task 009: Installing Voice/Data & Filter Shelf Connections	78
Task 010: Installing Voice/Data w/Filter 66-Block Connections	85
Task 011: Installing the Data-only Connections	89
Task 012: Installing External Voice Switch Connections	93
Task 013: Configuring the MIU	95
Task 014: Configuring Remote Management	110
Task 015: Testing the BitStorm 1900 Installation	119
Task 016: Testing Voice Connectivity	122
Task 017: Testing Data Connectivity	123
Task 018: EtherLoop End-to-end Testing	124

Installing the BitStorm 1900

The following tasks and procedures have been provided to properly install the BitStorm 1900 components. The installation is organized into numbered tasks with each task containing all of the procedural steps for completion. Complete each task in the order given and complete each step for a task procedure in the order given before continuing on to the next task.

Task 001: Pre-Installation Checklist

Before installing the BitStorm 1900 system verify the following steps have been completed:

Step	Procedure
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- | | |
|-----|---|
| 1.) | Perform site survey and verify equipment bays are installed correctly. |
| 2.) | Verify that the amount of rack space is adequate for the required installed application. |
| 3.) | Verify the racks are secured and electrically grounded according to standard industry practice. Refer to "Appendix A: Installation Requirements," on page 133 for specifications. |
| 4.) | Verify you have all necessary tools, equipment, and materials for the installation. Use the following table as a guide |

Table 2-11: Installation Tools, Equipment, and Materials

	Tools, Equipment, and Materials
	Installation hardware kit supplied with shelf
	Phillips head screwdriver (#1 or #2)
	Anti-static protection such as a grounded wrist strap
	Volt-ohm meter
	PC with serial port to configure MIU
	Cross-connect punch-down tool
	14 gauge stranded cable
	Cable ties
	5-BitStorm 1900 cable harnesses
	5-intermediate cables
	Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
	24 AWG Jumper Wires (24 wires per modem card)

Step	Procedure	cont.
5.)	Verify all necessary BS 1900 system components, hardware, circuit packs, and cables are at the installation site and that they are in good condition. If a Materials List is provided, verify the packing list with it.	
6.)	Determine if an AC or DC power card is to be used in the configuration. a.) If installing a DC power card, install the -48 V DC power source. b.) Next determine if a Switch Card or an MIU Card will be used in the configuration. <ul style="list-style-type: none">• If installing a Switch Card proceed to <i>"Task 003: Installing the BS1900 and Filter Shelves, on page 58."</i>• If installing an MIU Card proceed to <i>"Task 002: Installing the 19" Fan Tray, on page 54."</i>	
7.)	Complete all remaining tasks in the order given unless otherwise directed.	



You have completed this task.

Task 002: Installing the 19" Fan Tray

The 19" fan tray is necessary for a chassis housing one or more 6306, 6224, 10306, or 10224 CO modem cards. The fan tray is installed under each BS1900 shelf and contains six forced-air cooling fans to ensure sufficient cooling for operation. Use this procedure *only* to connect fan trays for use with the 6306, 6224, 10306, or 10224 CO modem cards. The following instructions are for installation of the -48 V DC and 110/220 V AC (switch selectable) fan trays.

Step Procedure

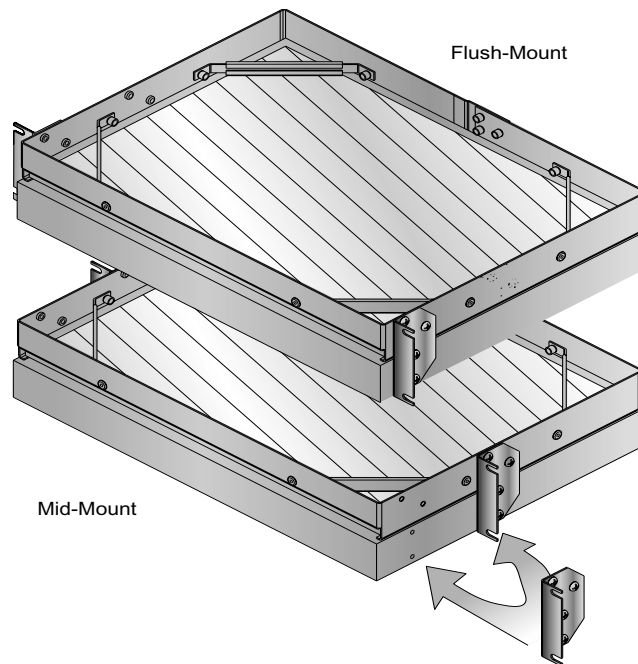
- 1.) Seat the fan tray at the bottom of the rack, leave room for at least 1 RU (Rack Unit) of air entry, then mount the two (2) side brackets (19" mounting ears) to secure the tray in the shelf. (For 23" racks, use 23" adapter ears.) Brackets are adjustable for flush and mid-mounting. Refer to *Figure 2-2, "Fan Tray Mounting,"* on page 55.



WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

Step	Procedure	cont.
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Figure 2-2: Fan Tray Mounting



- 2.) Connect power for -48 V DC. (If you are installing an AC fan tray proceed to step 3 to connect power for the 110 V AC fan tray.)
 - a.) The -48 V DC connection requires a 14-gauge stranded cable (not included).
 - b.) Connect the black power feed to the positive terminal and the red power feed to the negative terminal

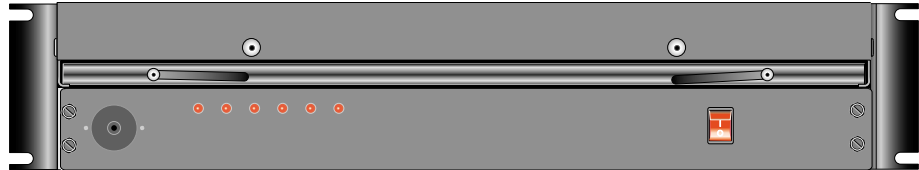
NOTE: This is the opposite of how non-telecommunications electronics are connected.

- c.) Route the other end to the matching connector on the BitStorm 1900 backplane.
 - d.) LEDs indicate fan failure.

NOTE: The power supply for the multiplexer must also be -48 V DC.

Step	Procedure	cont.
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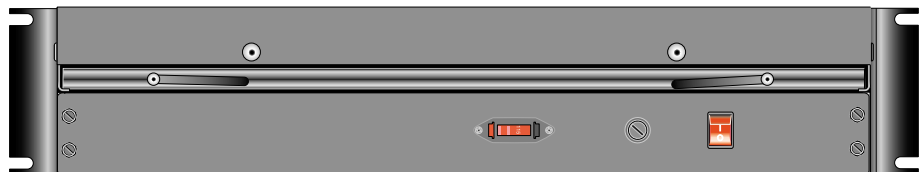
Figure 2-3: -48 V DC Fan Tray



- 3.) Connect power for the 110/220 V AC fan tray.
- a.) Connect the power cord to the IEC terminal connection on the front panel.
 - b.) Route the other end to a grounded outlet.

NOTE: The power supply for the multiplexer must also be 110 V AC.

Figure 2-4: 110 V AC Fan Tray



WARNING: POSSIBLE EQUIPMENT DAMAGE! Be sure to set the switch on the back panel of the 110/220 V AC fan tray to 115 V for a 110 V AC connection, and 230 V for a 220 V AC connection. Failure to do so will pop the fuse on the front panel.

Step	Procedure	cont.
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- 4.) Install the air filter frame.
- a.) The filter must be removed.
 - b.) Slide the frame into place.
- 5.) Install the air filter for the DC fan tray. (DO NOT install a filter in the AC fan tray).

NOTE: An air filter must be installed and maintained in the DC Fan Tray for NEBs compliance.



WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

- a.) Verify filter is installed in the frame.
- b.) Slide the unit into the fan tray.

NOTE: Installed air filters must be changed every 6 months. Bulk packs of 5 NEBs Air Filters (Part # 0100085-01) are available.



You have completed this task.

Task 003: Installing the BS1900 and Filter Shelves

Use this procedure to install the BitStorm 1900 modem shelf and filter shelf.

NOTE: The filter shelf is not required in data-only applications.

Requirements

This procedure requires the following:

- Equipment bay with enough space available installed, secured, and electrically grounded according to standard industry practice (specifications for a suitable bay are described in the *Appendix A* section entitled, "*Bay Requirements and Specifications*," on page 133).
- Installation hardware kit supplied with shelf
- Phillips head screwdriver (#1 or #2)



WARNING: POSSIBLE EQUIPMENT DAMAGE! DO NOT
rest objects such as tools or anything else
on top of the BitStorm 1900 shelves. The
mounting fasteners can only support the
weight of the shelf. Additional weight may
weaken the fasteners.

Step	Procedure
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- 1.)** Select and apply grounded anti-static protection.



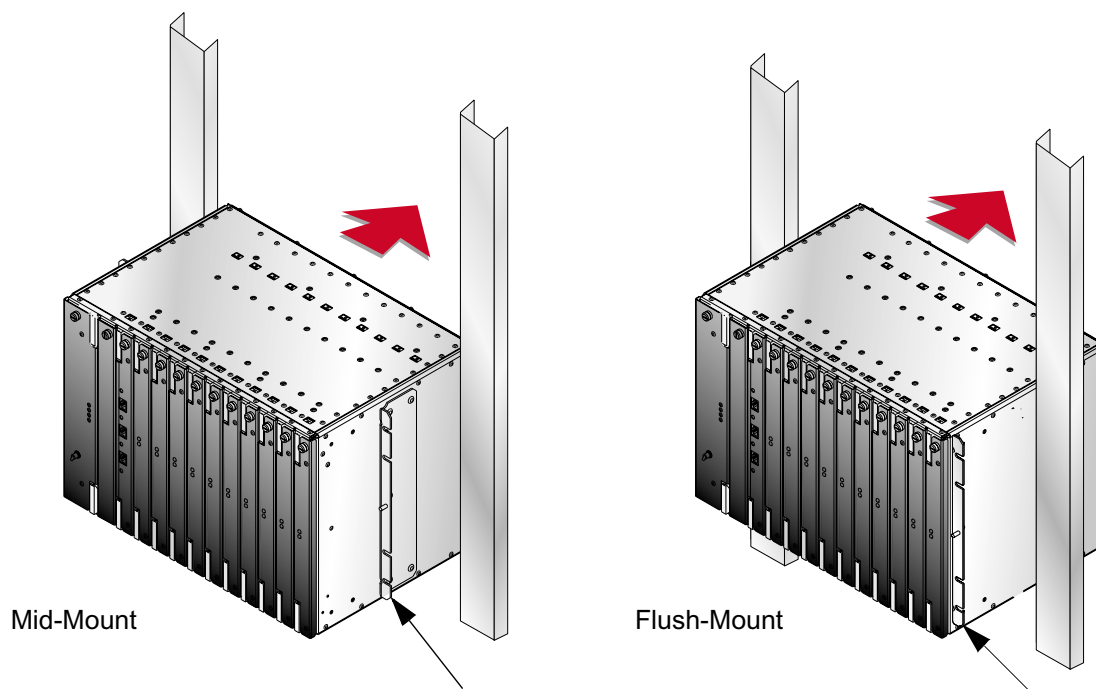
WARNING: ELECTROSTATIC DISCHARGE! Anti-static protection required! The BitStorm 1900 shelves are shipped with the circuit packs installed. When handling any circuit pack, you must wear grounded anti-static protection. The discharge of static electricity can damage the circuit packs.

- 2.)** Select the mounting point in the bay where the top holes of the shelf mounting flanges will be attached.



WARNING: POSSIBLE EQUIPMENT DAMAGE! Installation Requirement! For a single-shelf application without a Fan Tray, be sure to leave at least three inches of space above and below the BitStorm 1900 shelves to dissipate heat.

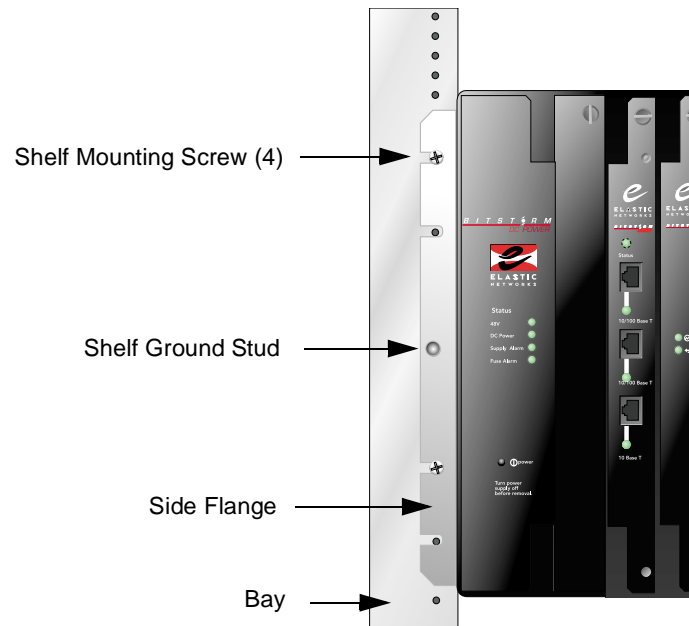
- 3.)** Align the holes of the shelf mounting flanges with the mounting holes in the bay as shown in *Figure 2-5, "BitStorm 1900 Modem Shelves Mounted in Bay."*

Figure 2-5: BitStorm 1900 Modem Shelves Mounted in Bay

- 4.) Using the shelf mounting screws provided in the shelf hardware kit, fasten the left and right flanges to the bay as shown in *Figure 2-6, "BitStorm 1900 Shelf Fastened to Bay,"* on page 61.

Step	Procedure	cont.
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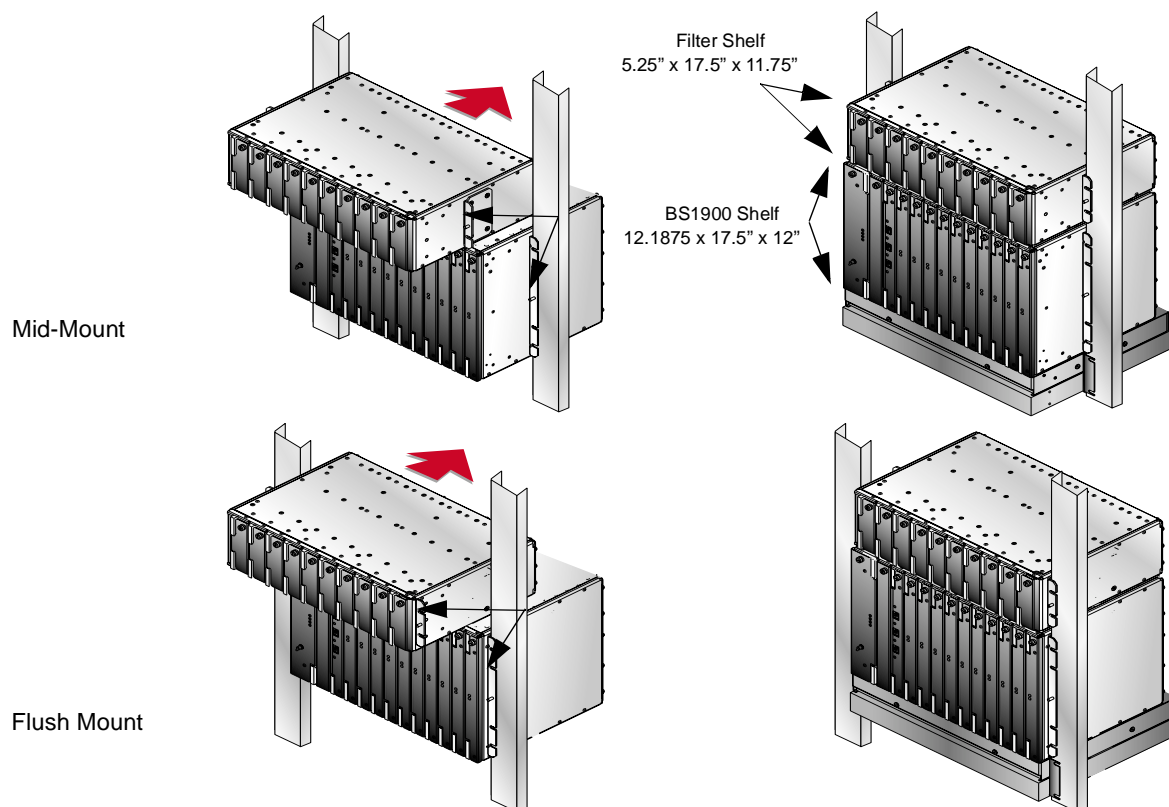
Figure 2-6: BitStorm 1900 Shelf Fastened to Bay



5.) Proceed according to the following table:

If the application is	Then
Voice/data	Align and mount a filter shelf <u>directly</u> above the BitStorm 1900™ Access Multiplexer shelf as shown in <i>Figure 2-7, "Filter Shelf Mounting in Bay," on page 62.</i>
Data-only	Do not install the filter shelf. NOTE: For a Data-only application: Stop here you have completed the task.

Step Procedure

cont.**Figure 2-7: Filter Shelf Mounting in Bay****You have completed this task.**

Task 004: Installing the Air Baffle

Use this procedure to install the BitStorm 1900 Air Baffle.

Requirements

This procedure requires the following:

- Phillips head screwdriver (#1 or #2)

Step Procedure

- 1.) Verify that the mounting adapters are in the same position as the BS 1900 and the Filter Shelf (i.e., mid-mount or flush mount).
- 2.) Place directly above the BS 1900 or Filter Shelf.
- 3.) Secure with mounting screws.



You have completed this task.

Task 005: Installing the Circuit Packs

Use this procedure to install the BitStorm 1900 circuit packs.

Requirements

This procedure requires the following:

- Grounded anti-static protection



WARNING: ESD (ELECTROSTATIC DISCHARGE) ! Anti-static protection required! When handling any circuit pack, you must wear grounded anti-static protection. The discharge of static electricity can damage the circuit packs.

Step Procedure

- 1.) Place anti-static strip on wrist and attach to the grounded rack.
- 2.) Remove the circuit pack from the anti-static packaging.
- 3.) Align the card in the appropriate slot.
- 4.) Seat the card by pressing firmly into place.



You have completed this task.

Task 006: Connecting Power to the Shelf

Use this procedure to install the power feeds from a -48 V DC or 110 V AC power source to the BitStorm 1900 modem shelf.

NOTE: The filter shelf does not require a power feed.

Requirements

This procedure requires the following:

- Volt-ohm meter
- BitStorm 1900 DC power harness
- -48 V DC power fuse bay or AC-to-DC rectifier or 110 V AC power

Power supply and wiring specifications are described in "Appendix A: Installation Requirements," on page 133.

Step Procedure

- 1.) Eject all cards (Power, MIU Shelf Processor/Switch Card, and Modems) from the backplane of the shelf. Ensure that the cards completely dislodge from their backplane connectors.



WARNING: POSSIBLE EQUIPMENT DAMAGE! Never connect untested power to the BitStorm 1900 with any circuit packs installed. The BitStorm 1900 shelf and rectifier could be seriously damaged if the power feed polarities on a -48 V DC power supply are reversed.

- 2.) Route and connect a ground wire from the building's grounding facility to the ground stud on the side flange of the shelf. Refer to the Appendix A section entitled, "Grounding Environment Specifications," on page 135 for the BitStorm 1900 grounding requirements.

Step	Procedure	cont.
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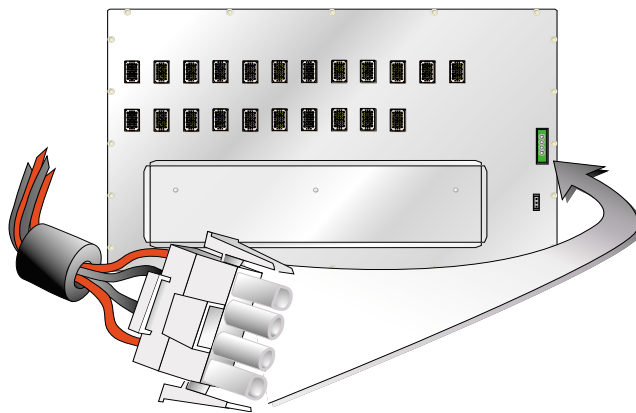
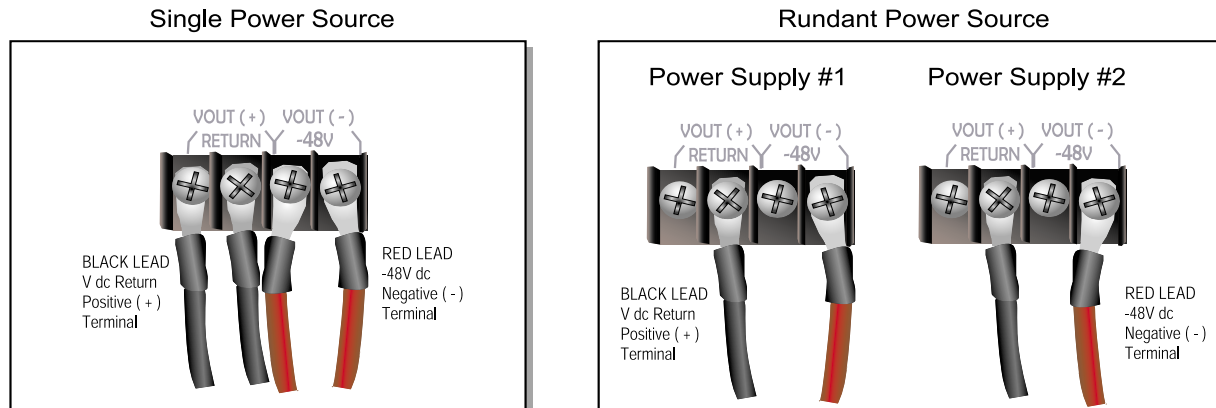
- 3.) With the power supply turned OFF, connect the -48 V DC (250W/260W) or 110 V AC (70W/260W) power source according to the following table and *Figure 2-8, "Typical DC Power Harness Connection to -48 V DC (250W/260W) Power Source,"* on page 67.



WARNING: POSSIBLE EQUIPMENT DAMAGE! With the -48 V DC power supply, reversed polarities on the power feed can irreparably damage the BitStorm 1900 shelf components. Be certain that power feeds are connected properly to the power source, with the red lead connected to the -48 V DC supply (negative terminal) as shown in the table below. Note that this is the opposite of other (non-telecommunications) applications, in which the red lead is usually connected to the positive (+) terminal.

Power Lead	Power Source	Terminal Connection	Line Fuse
Red	-48 V DC supply (250W/260W)	Negative (-)	3 AMP, 250W 10 AMP, 260W
Black	-48 V DC return (250W/260W)	Positive (+)	
N/A	110 V AC supply (70W/260W)	IEC	2 AMP, 70w 6 AMP, 260W

Step Procedure

cont.**Figure 2-8: Typical DC Power Harness Connection to -48 V DC (250W/260W) Power Source**

- 4.) For a -48 V DC power source, connect the red power lead to the Negative (-) terminal connection and the black power lead to the Positive (+) terminal connection as seen in Figure 2-8, "Typical DC Power Harness Connection to -48 V DC (250W/260W) Power Source," on page 67.

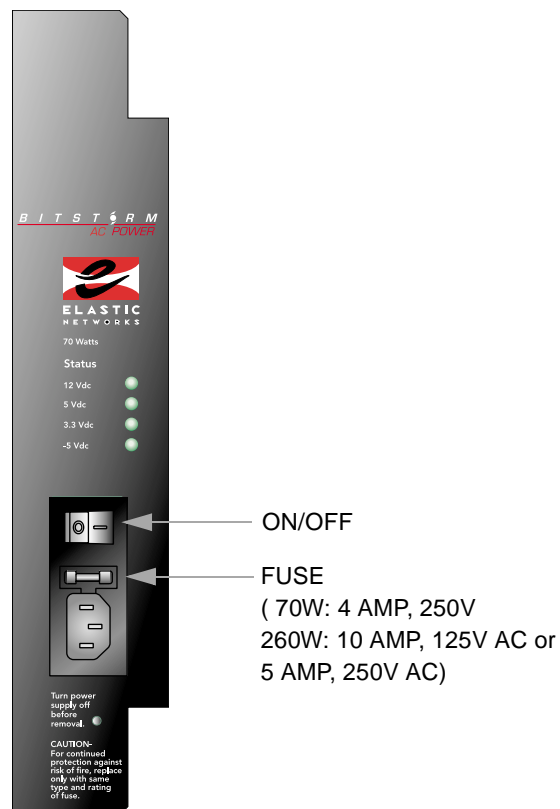
NOTE: If using a -48 V DC power supply, use an appropriate volt-ohm meter to test and verify that the red power feed at the shelf is the -48 V DC supply. The meter should read between -46 and -56 V DC.

Step	Procedure	cont.
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NOTE: The redundant power supply sources connect to two pairs of wires on the BitStorm 1900's power harness and are electrically the same.

- 5.) Route the other end of the DC power harness to the DC power connector on the backplane of the BitStorm 1900 modem shelf. The connector only fits one way.
- 6.) For an AC power supply, connect the power cord to the IEC terminal connection on the front panel.

Figure 2-9: Typical Power Connection to 70W/260W Power Source



- 7.) Route the other end of the cord to a grounded socket.
- 8.) Re-seat the power, modem, and MIU Shelf processor/Switch cards into their shelf backplane connectors.

Step	Procedure	cont.
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- 9.) Secure the power harness in accordance with local office procedures.
- 10.) Turn ON the power to the shelf from the power supply.



You have completed this task.

Task 007: Installing the Data Network Connection with an MIU

Use this procedure to connect the BitStorm 1900 to the Ethernet data network using an MIU.

Requirements

This procedure requires the following:

- Ethernet data network installed
- Serial cable and DB9S to RJ-11 serial adapter (included)
- PC with serial port to configure system
- Two Category 5 crossover or straight cables terminated with RJ-45 connectors according to *Table 2-1* (shown below).

Table 2-1: Data Cable Selection for MIU Shelf Processor

MIU	Cable Requirements	Application
RS-232	RJ-11 cable (a DB9S to RJ-11 serial adapter is included)	To a PC (for configuration only)
Ethernet Pass Thru	50-pin connector decapus cable (DB50F) part # 04-00017-01, with 10 RJ-45 cables (included)	To Ethernet switch
10 Base-T X (top port) (Management ports must be connected)	RJ-45 straight cable, 6' (included)	To a port on an intermediate switch or hub NOTE: Switch or hub must have connection to EtherLoop network router.
10 Base-T (bottom port)	Not used in this release	Not used in this release

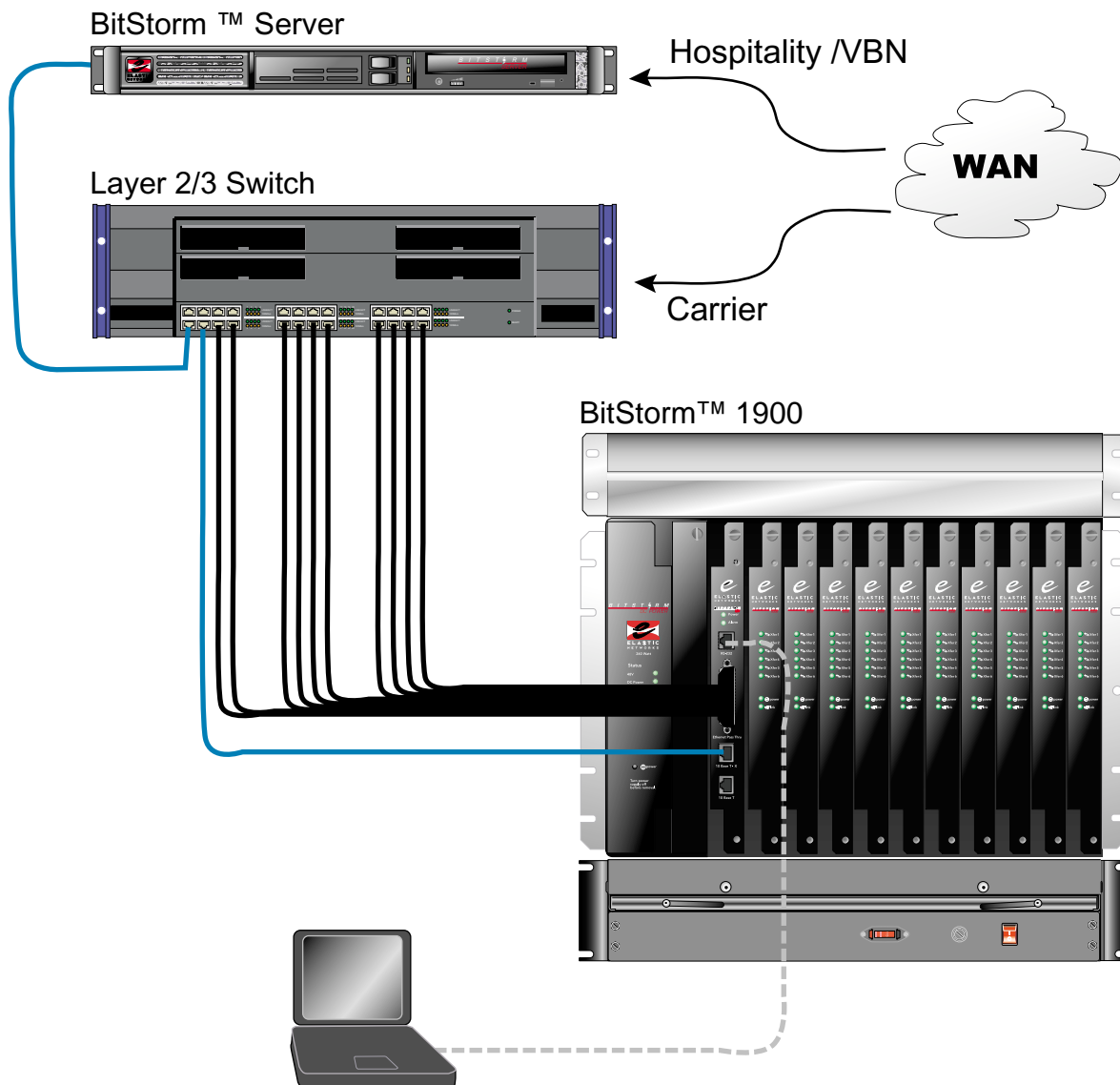
Step Procedure

- 1.) Connect one end of the RJ-45 (crossed) cable to the switch/router, then route the other end to the 10 Base T-X port of MIU.

Step	Procedure	cont.
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Figure 2-10 shows a typical EtherLoop data network connection with the BitStorm 1900™ Access Multiplexer using an MIU.

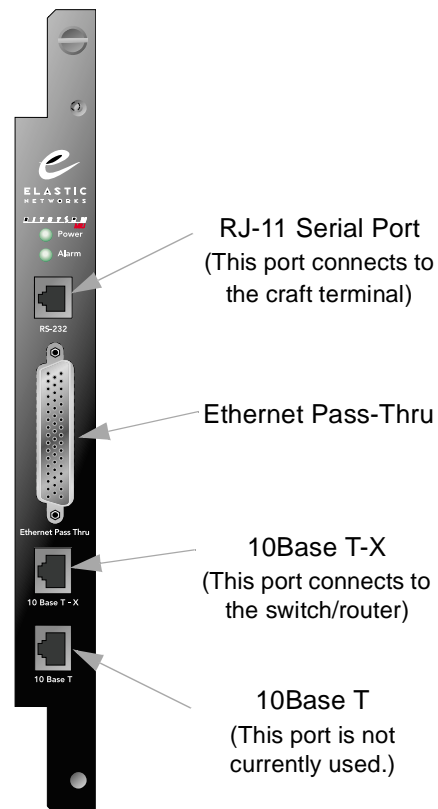
Figure 2-10: BitStorm 1900 Data Connection via MIU



Step	Procedure	cont.
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- 2.) Connect the 50-pin connector to the Ethernet Pass Thru port, then connect the cables at the other end to the corresponding switch(es). Refer to *Figure 2-11* (shown below).
- 3.) Connect the RJ-11 cable with the adapter (DB9S to RJ-11) to the local craft terminal (PC/laptop). Then connect the other end to the RS-232 port on the MIU. Refer to *Figure 2-11* (shown below).
- 4.) Verify that the green LED at the EtherLoop hub/router port illuminates, indicating connectivity is established from the BitStorm 1900™ Access Multiplexer shelf to the switch/router.

Figure 2-11: MIU Card With Cable Connections



Step	Procedure	cont.
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5.) Proceed according to the following table:

If the application is	Then
Voice/data	GO TO: <i>"Task 009: Installing Voice/Data & Filter Shelf Connections, on page 78."</i> OR <i>"Task 010: Installing Voice/Data w/Filter 66-Block Connections, on page 85."</i>
Data-only	GO TO: <i>"Task 011: Installing the Data-only Connections, on page 89."</i>



You have completed this task.

Task 008: Installing the Data Network with a Switch Card

Use this procedure to connect the BitStorm 1900 to the Ethernet data network using a Switch Card.

Requirements

This procedure requires the following:

- Ethernet 100Base-T data network installed
- Two Category 5 crossover or straight cables terminated with RJ-45 connectors according to *Table 2-2*.

Table 2-2: Data Cable Selection for Switch Card

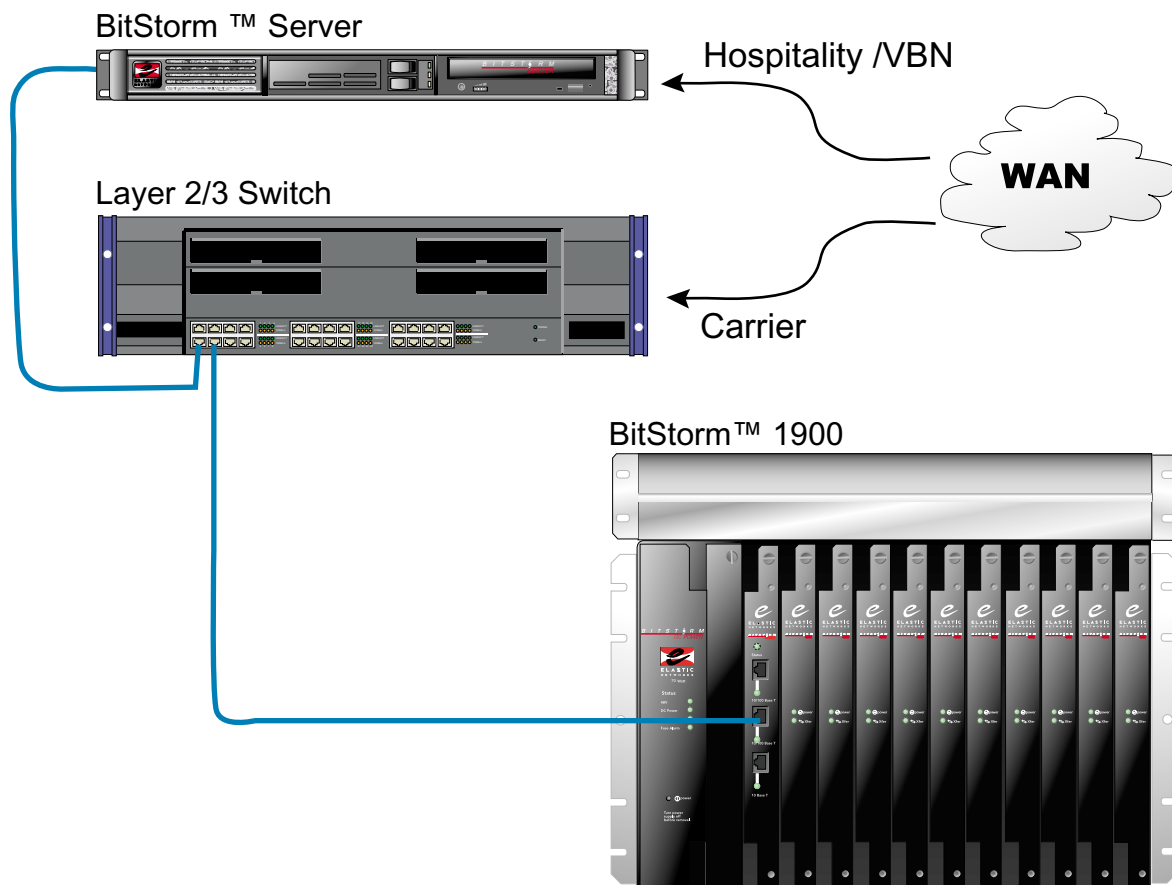
Switch Card Connection Port	Cable Requirements	Application
BitStorm 1900™ Access Multiplexer Switch card 10/100Base-T uplink(s) (Not crossed)	Category 5 straight cable	To a <u>crossed</u> port such as an intermediate switch or hub port (non-uplink)
BitStorm 1900™ Access Multiplexer Switch card 10/100Base-T uplink(s) (Not crossed)	Category 5 cross-over cable	To another <u>uncrossed</u> connection such as an uplink port or PC
BitStorm 1900™ Access Multiplexer Switch card 10Base-T port (Crossed)	Category 5 cross-over cable	To a <u>crossed</u> port on an intermediate switch or hub NOTE: Switch or hub must contain connection to EtherLoop network router.

Step Procedure

- 1.) Connect one end of the Category 5 cable to the Ethernet 10/100Base-T data network supporting the BitStorm 1900 Access Multiplexer.
- 2.) Route the other end of the cable to the Ethernet 10/100Base-T Switch card slot on the front of the BitStorm 1900 modem card shelf.

Figure 2-12, "BitStorm 1900 Data Connection with a Switch Card." shows a typical EtherLoop data network connection using a Switch Card in the BitStorm 1900.

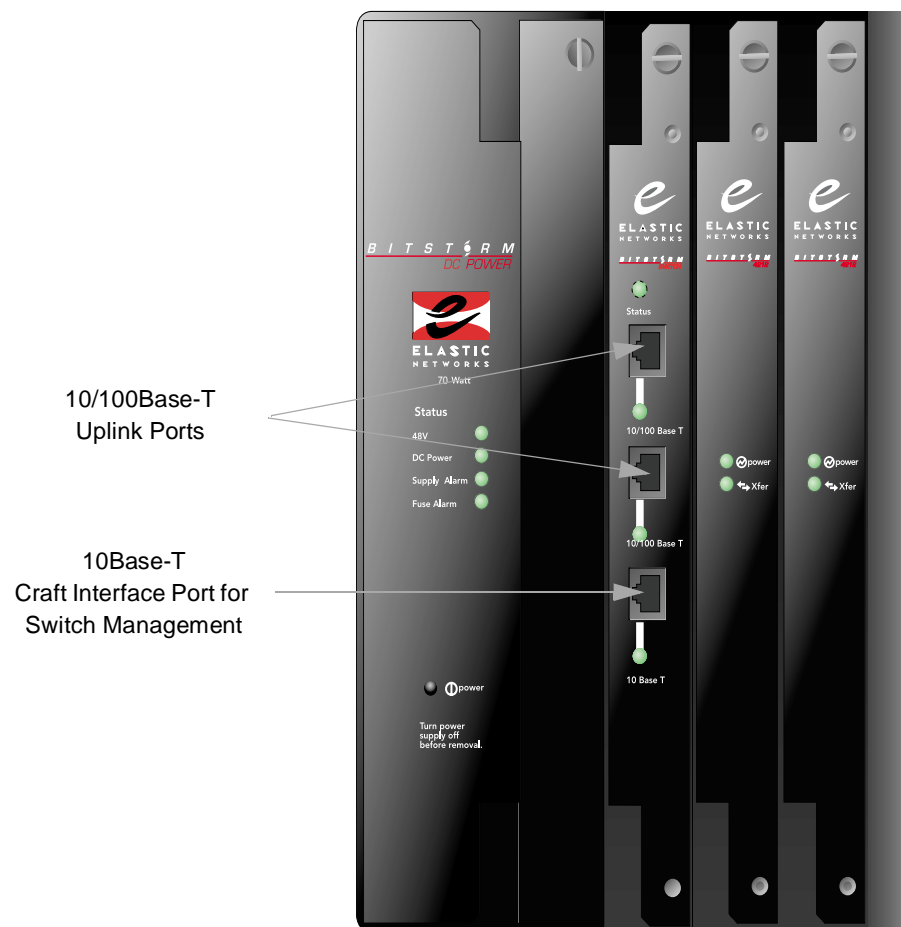
Figure 2-12: BitStorm 1900 Data Connection with a Switch Card



Step	Procedure	cont.
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- | | | |
|-----|--|--|
| 3.) | Connect the RJ-45 plug to one of the two the RJ-45 receptacles on the front faceplate of the BitStorm 1900 Switch card. <i>Figure 2-13, "Switch Card Connections."</i> | |
|-----|--|--|

Figure 2-13: Switch Card Connections



- | | | |
|-----|---|--|
| 4.) | Secure the cable in accordance with local office procedures. | |
| 5.) | Repeat steps 1-4 for the second and third connections (if required). Be sure to connect the BitStorm 1900 Access Multiplexer data connections to separate LAN segments. | |

Step	Procedure	cont.
-------------	------------------	--------------

- 6.) Verify that the green LED at the EtherLoop hub/router port illuminates, indicating connectivity is established from the BitStorm 1900 shelf to the hub/router.

NOTE: If a 10/100 Base-T port on the BitStorm 1900 Switch Card is connected to a 10Base-T network, that port LED should display a yellow-orange light. If a 10/100Base-T port on the BitStorm 1900™ Access Multiplexer card is connected to a 100Base-T network, that port LED should display a green light.

- 7.) Proceed according to the following table:

If the application is	Then
Data-only	GO TO: "Task 011: Installing the Data-only Connections, on page 89."
Voice/data	GO TO: "Task 009: Installing Voice/Data & Filter Shelf Connections, on page 78." OR "Task 010: Installing Voice/Data w/ Filter 66-Block Connections, on page 85."



You have completed this task.

Task 009: Installing Voice/Data & Filter Shelf Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in voice/data applications.

Requirements

This procedure requires the following tools and materials:

- 10-BitStorm 1900 cable harnesses
- 10-intermediate cables
- 10-BitStorm 1900 data cables

"Appendix B: Cabling Specifications," on page 143 contains the specifications for the cables and wiring required in this procedure.

Step Procedure

- 1.) Place and secure the dedicated EtherLoop cross-connect on the facility main distribution frame.
- 2.) Designate and label one side of each block as "Line/CPE," and the other side as "Voice."
- 3.) Review pin and pair assignments in *Figure 2-3, "Pin and Pair Assignments for the Champ to Omni Grid Cable (part # 04-00007-10)," on page 79.*

Step Procedure**cont.****Table 2-3: Pin and Pair Assignments for the Champ to Omni Grid Cable (part # 04-00007-10)**

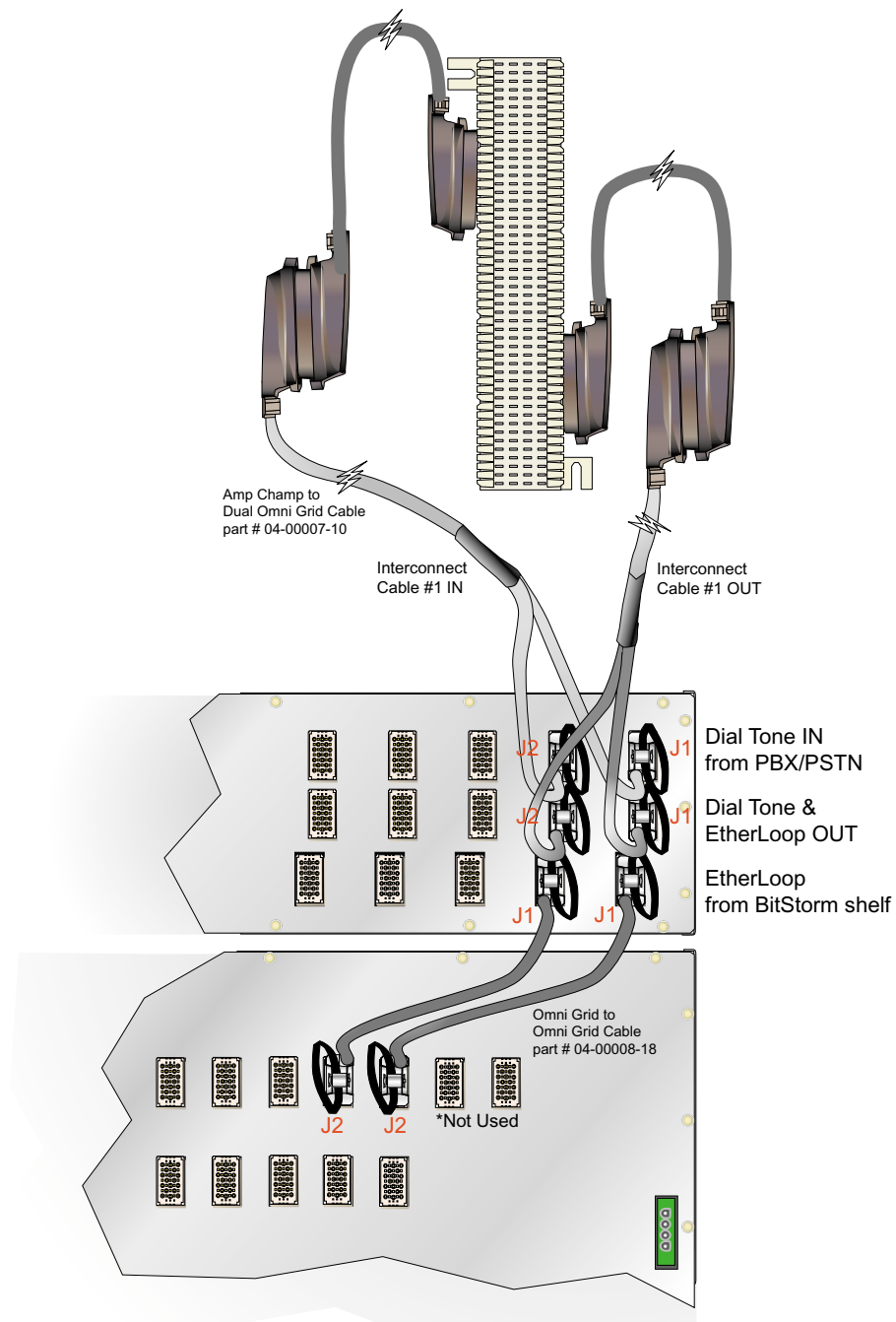
From Conn	From Pin #	With Pair #	Color Code	To	To Pin #		From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	B2	R1	BLU/WHT	P1	1		J1	A2	T1	WHT/BLU	P1	26
	E2	R2	OR/WHT		2			D2	T2	WHT/OR		27
	B3	R3	GR/WHT		3			A3	T3	WHT/GR		28
	E3	R4	BR/WHT		4			D3	T4	WHT/BR		29
	B4	R5	SLT/WHT		5			A4	T5	WHT/SLT		30
	E4	R6	BLU/RED		6			D4	T6	RED/BLU		31
	B6	R7	OR/RED		7			A6	T7	RED/OR		32
	E6	R8	GR/RED		8			D6	T8	RED/GR		33
	B7	R9	BR/RED		9			A7	T9	RED/BR		34
	E7	R10	SLT/RED		10			D7	T10	RED/SLT		35
	B8	R11	BLU/BLK		11			A8	T11	BLK/BLU		36
	E8	R12	OR/BLK		12		J2	D8	T12	BLK/OR		37
J2	B2	R13	GR/BLK	P1	13			A2	T13	BLK/GR	P1	38
	E2	R14	BR/BLK		14			D2	T14	BLK/BR		39
	B3	R15	SLT/BLK		15			A3	T15	BLK/SLT		40
	E3	R16	BLU/YEL		16			D3	T16	YEL/BLU		41
	B4	R17	OR/YEL		17			A4	T17	YEL/OR		42
	E4	R18	GR/YEL		18			D4	T18	YEL/GR		43
	B6	R19	BR/YEL		19			A6	T19	YEL/BR		44
	E6	R20	SLT/YEL		20			D6	T20	YEL/SLT		45
	B7	R21	BLU/VIO		21			A7	T21	VIO/BLU		46
	E7	R22	OR/VIO		22			D7	T22	VIO/OR		47
	B8	R23	GR/VIO		23			A8	T23	VIO/GR		48
	E8	R24	BR/VIO		24			D8	T24	VIO/BR		49
	N/A		SLT/VIO		25			N/A		VIO/SLT		50

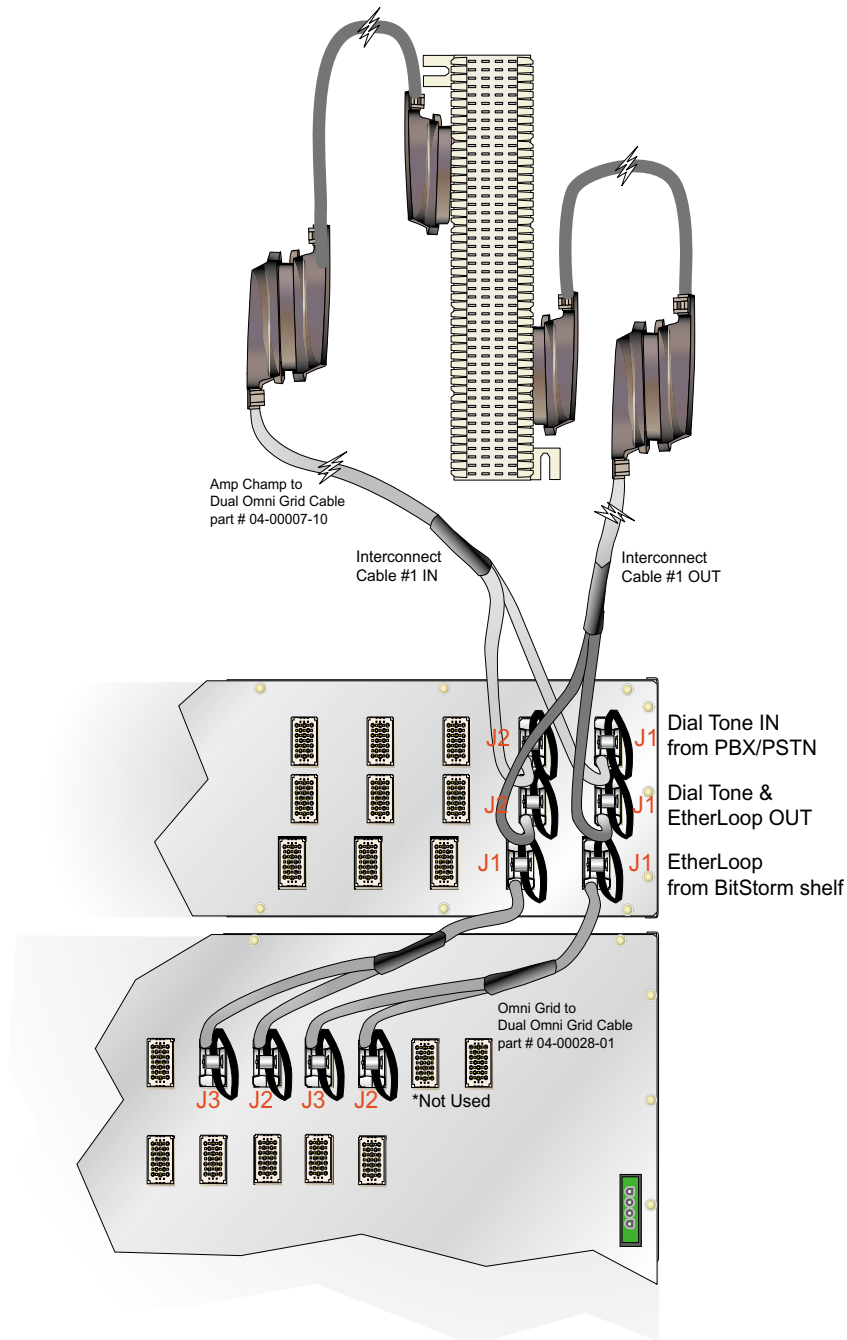
Step	Procedure	cont.
4.)	Connect one Amp-Champ connector of an intermediate cable to the "Line/CPE" side of the EtherLoop cross-connect block, then connect the other end to an Amp-Champ to Dual Omni Grid cable.	
5.)	Connect the Amp-Champ connector of the second intermediate cable to the "Voice" side of the EtherLoop cross-connect block, then connect the other end to an Amp-Champ to Dual Omni Grid cable.	
6.)	Connect the two Omni-Grid connectors from the EtherLoop "Line/CPE" side to the "Dial Tone & EtherLoop OUT" ports of the filter shelf as shown in <i>Figure 2-15, "Line/CPE and Voice Connections on the Filter Shelf for 6306 or 10306 Modem Cards,"</i> on page 82.	
7.)	Connect the two Omni-Grid connectors from the "Voice" side to the "Dial Tone IN from PBX/PSTN" ports of the filter shelf as shown in <i>Figure 2-14, "Line/CPE and Voice Connections on the Filter Shelf for 4212 Modem Cards,"</i> on page 81, <i>Figure 2-15, "Line/CPE and Voice Connections on the Filter Shelf for 6306 or 10306 Modem Cards,"</i> on page 82, <i>Figure 2-16, "Line/CPE and Voice Connections on the Filter Shelf for 6224 or 10224 Modem Cards,"</i> on page 83, and/or <i>Figure 2-17, "Voice/Data Filter 66-Block Connections for 4212 CO Modems,"</i> on page 86. Record EtherLoop assignments.	

Step Procedure

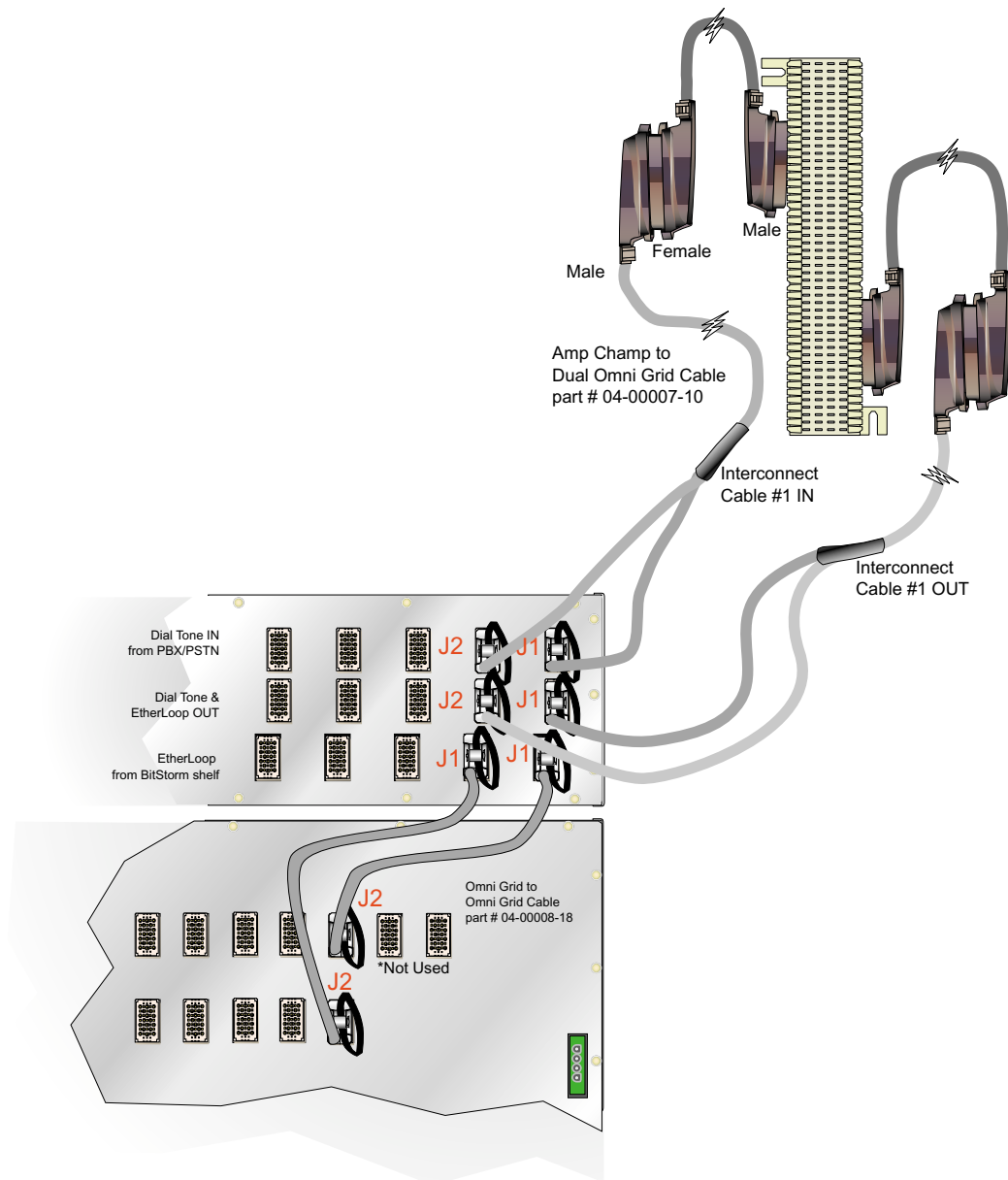
cont.

Figure 2-14: Line/CPE and Voice Connections on the Filter Shelf for 4212 Modem Cards



Step Procedure**cont.****Figure 2-15: Line/CPE and Voice Connections on the Filter Shelf for 6306 or 10306 Modem Cards**

Step Procedure

cont.**Figure 2-16: Line/CPE and Voice Connections on the Filter Shelf for 6224 or 10224 Modem Cards**

Step	Procedure	cont.
------	-----------	-------

- 8.) Go to "Task 012: Installing External Voice Switch Connections, on page 93."



You have completed this task.

Task 010: Installing Voice/Data w/Filter 66-Block Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in applications where voice/data service is required with a Filter 66-Block.

Requirements

This procedure requires the following tools and materials:

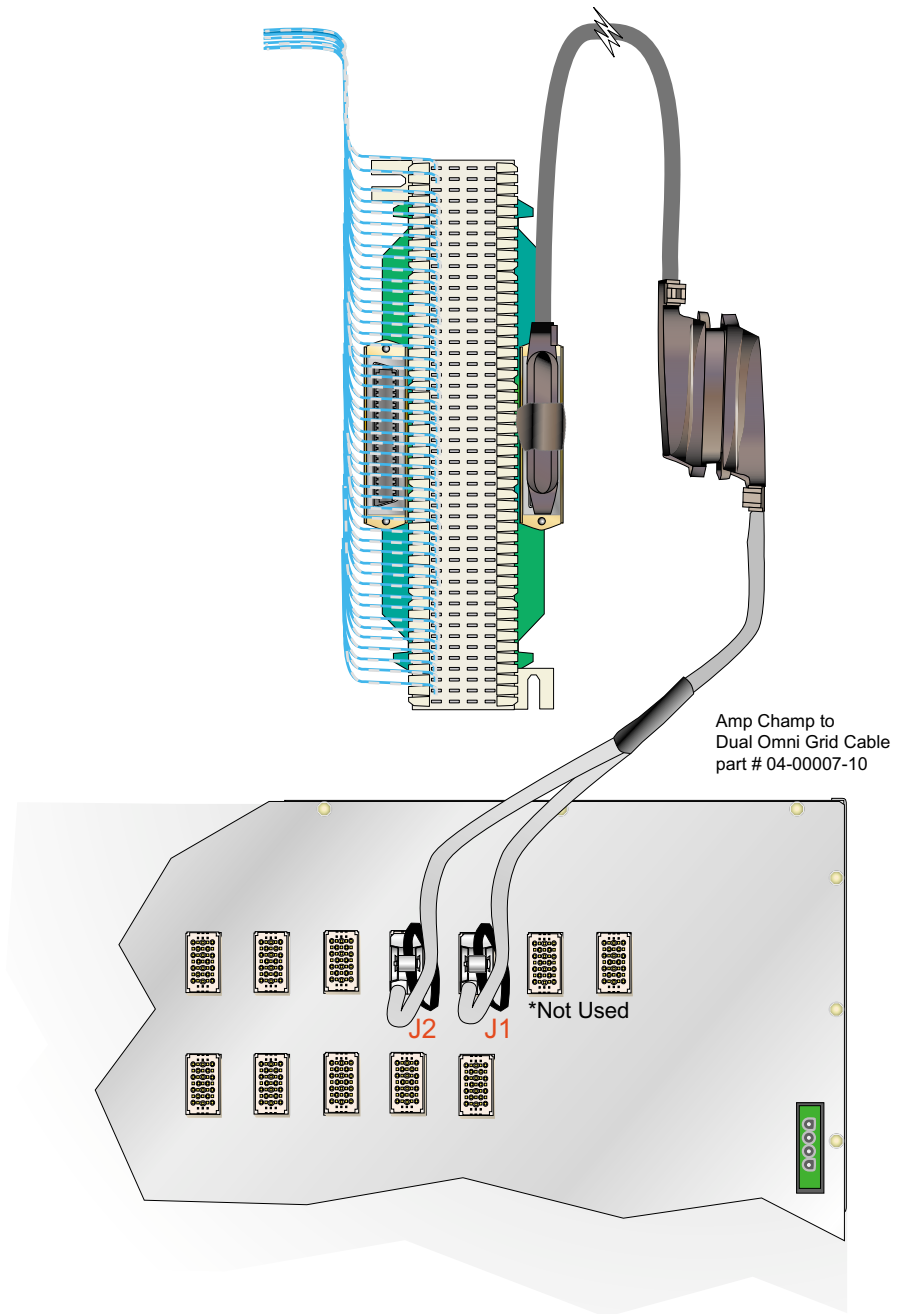
- 5-BitStorm 1900 cable harnesses
- 5-intermediate cables
- Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
- Cross-connect punch-down tool
- Jumper Wire (24AWG)

"Appendix B: Cabling Specifications," on page 143 contains the complete specifications for the cables and wiring required in this procedure.

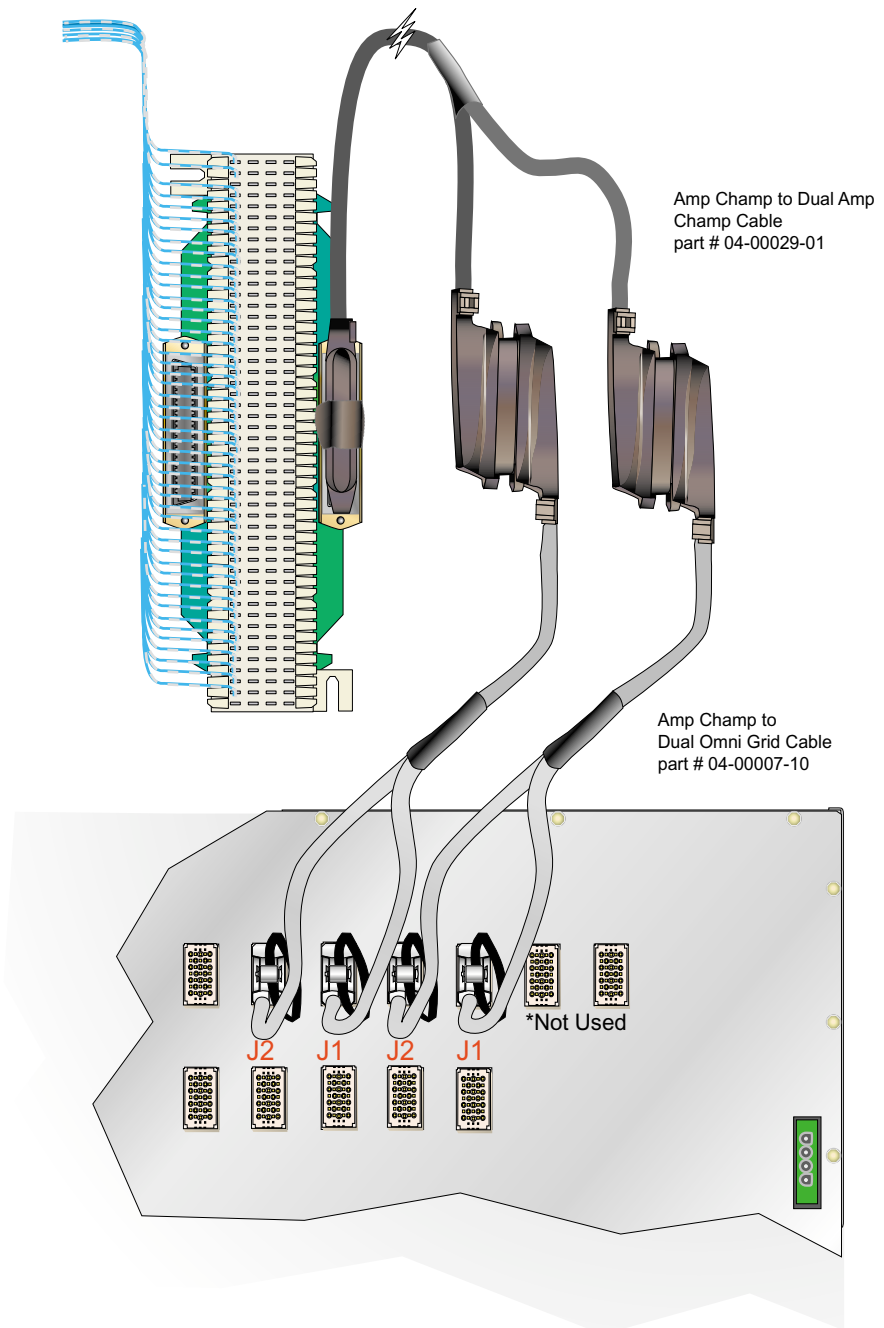
Step Procedure

- 1.) Mount 66-blocks on wall in an appropriate area for running jumpers.
- 2.) Verify the room position on frame blocks.
- 3.) Replace jumpers to 66-Filter Block and retest phone lines.
- 4.) Refer to *Figure 2-17, "Voice/Data Filter 66-Block Connections for 4212 CO Modems," on page 86, Figure 2-18, "Voice/Data Filter 66-Block Connections for 6306 and 10306 CO Modems," on page 87, and Figure 2-19, "Voice/Data Filter 66-Block Connections for 6224 and 10224 CO Modems," on page 88.*

Step Procedure

cont.**Figure 2-17: Voice/Data Filter 66-Block Connections for 4212 CO Modems**

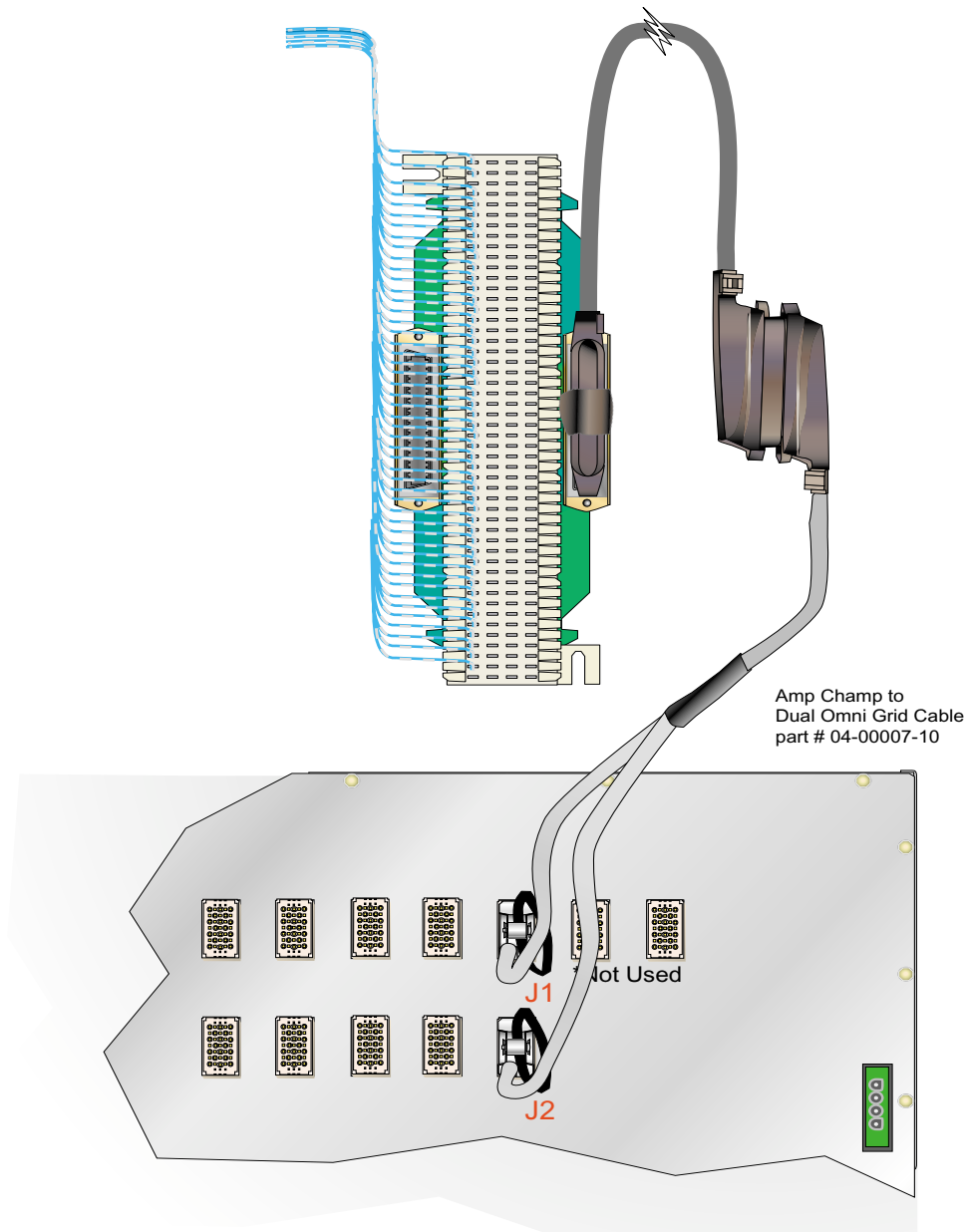
Step Procedure

cont.**Figure 2-18: Voice/Data Filter 66-Block Connections for 6306 and 10306 CO Modems**

Step Procedure

cont.

Figure 2-19: Voice/Data Filter 66-Block Connections for 6224 and 10224 CO Modems



You have completed this task.

Task 011: Installing the Data-only Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in applications where no voice service is required.

Requirements

This procedure requires the following tools and materials:

- 5-BitStorm 1900 cable harnesses
- 5-intermediate cables
- Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
- Cross-connect punch-down tool

"Appendix B: Cabling Specifications," on page 143 contains the complete specifications for the cables and wiring required in this procedure.

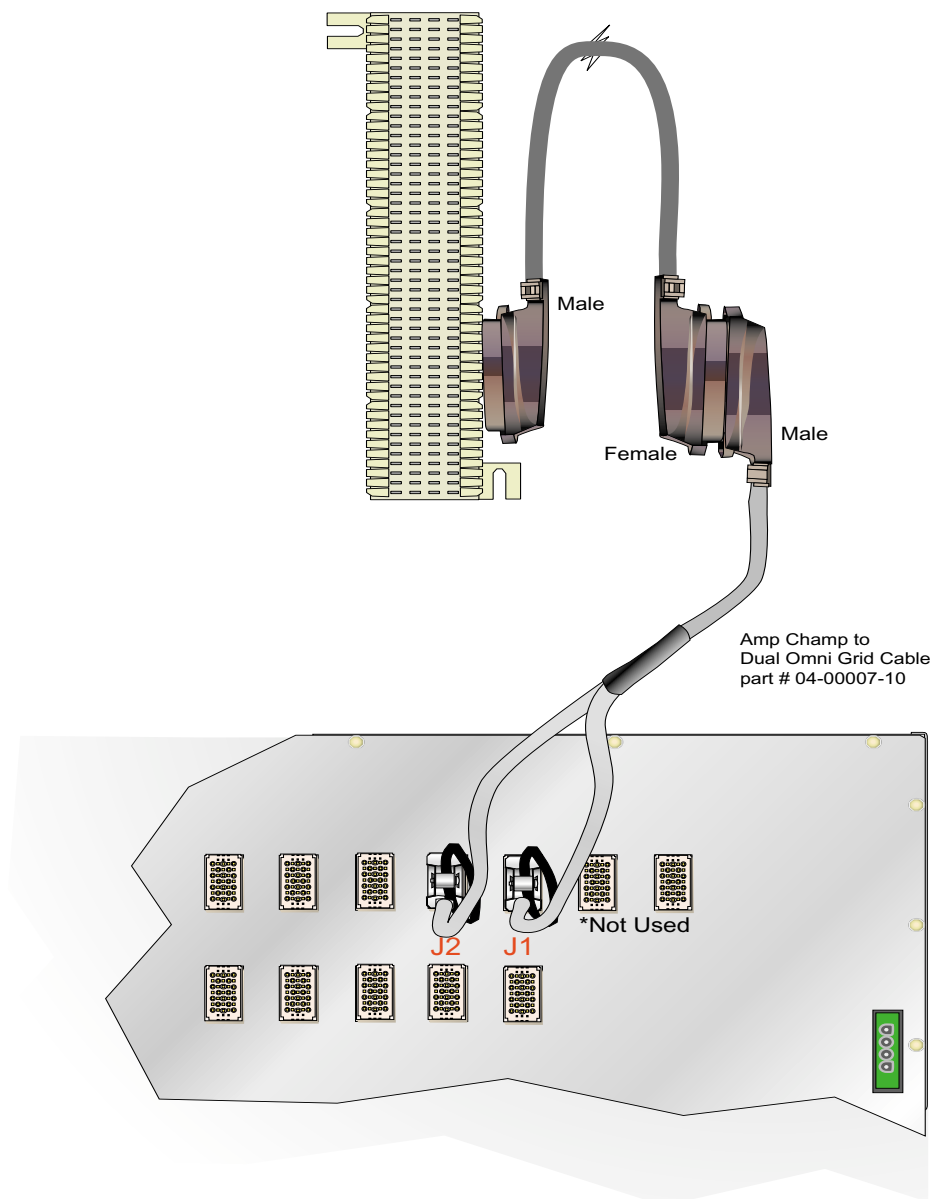
Step Procedure

- 1.) Place and secure the dedicated EtherLoop cross-connect on the facility main distribution frame.
- 2.) Route the Tip/Ring pairs originating from the StormPort/CPE lines to the EtherLoop cross-connect.
- 3.) Terminate the StormPort /CPE Tip/Ring connections to the EtherLoop cross-connect block. Record the StormPort/CPE Tip/Ring assignments of the EtherLoop cross-connect according to local office procedures.
- 4.) Connect one Amp-Champ connector of an intermediate cable to the matching connector on the EtherLoop cross-connect block, then route the other connector to the equipment bay containing the BitStorm 1900.
- 5.) Connect the J1/J2 split connectors on the cable harness to the matching J1/J2 modem connectors of two adjacent modem cards in the BitStorm 1900 shelf. Refer to *Figure 2-20, "Data-only Connections on the 66-Block with 4212 CO Modem Cards," on page 90, Figure 2-21, "Data-only Connections on the 66-Block for 6306 and 10306 CO Modem Cards," on page 91, and/or*

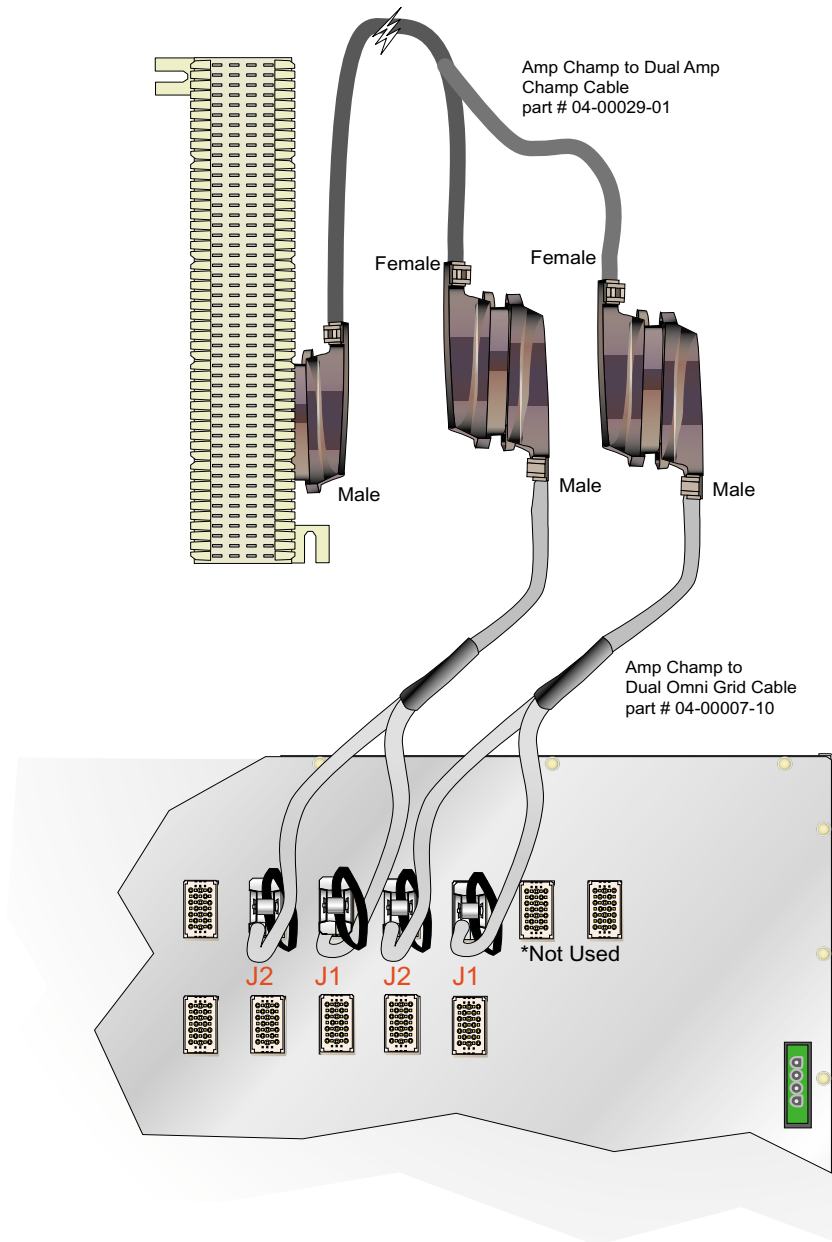
Step	Procedure	cont.
------	-----------	-------

Figure 2-22, "Data-only Connections on the 66-Block for 6224 and 10224 CO Modem Cards," on page 92. Record the EtherLoop assignments.

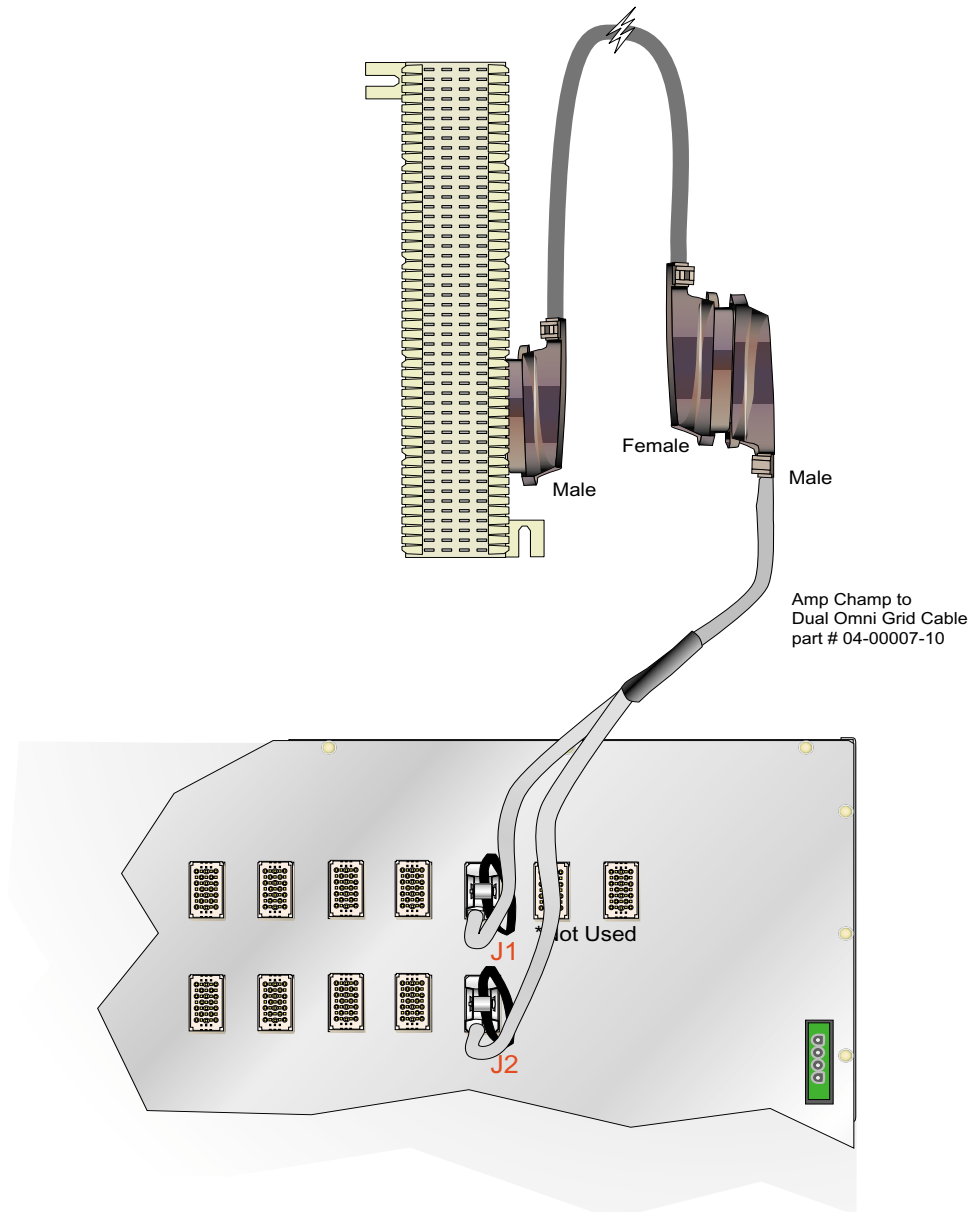
Figure 2-20: Data-only Connections on the 66-Block with 4212 CO Modem Cards



Step Procedure

cont.**Figure 2-21: Data-only Connections on the 66-Block for 6306 and 10306 CO Modem Cards**

Step Procedure

cont.**Figure 2-22: Data-only Connections on the 66-Block for 6224 and 10224 CO Modem Cards****You have completed this task.**

Task 012: Installing External Voice Switch Connections

Use this procedure to connect the BitStorm 1900 lines to an external voice facility.

Requirements

This procedure requires the following tools and materials:

- 24-jumper wires (24-AWG) for each BitStorm 1900 modem card installed (240 wires for a full shelf)
- Cross-connect punch-down tool

"Appendix B: Cabling Specifications," on page 143 contains the specifications for the cables and wiring required in this procedure.

Step Procedure

- 1.) Identify the existing Tip and Ring jumper connections from the external voice facility cross-connect block to the customer-premise equipment (CPE) cross-connect block.
- 2.) Verify dial tone on the existing voice facility at the CPE cross-connect block for the line being rerouted.
- 3.) Remove the Tip and Ring jumper connections from the line.
- 4.) Terminate the Tip/Ring jumper wires from the cross-connect of the external voice facility to the "Voice" side of the EtherLoop cross-connect.
- 5.) Terminate the jumper wires from the CPE Tip/Ring connections to the "EtherLoop" side of the cross-connect block.
- 6.) Verify the new connection by testing dial tone again at the CPE cross-connect block.
- 7.) Secure all cabling in accordance with local office procedures.

Step	Procedure	cont.
-------------	------------------	--------------

- 8.) Record the EtherLoop cross-connect Tip/Ring assignments for the voice facility according to local office procedures.



You have completed this task.

Task 013: Configuring the MIU

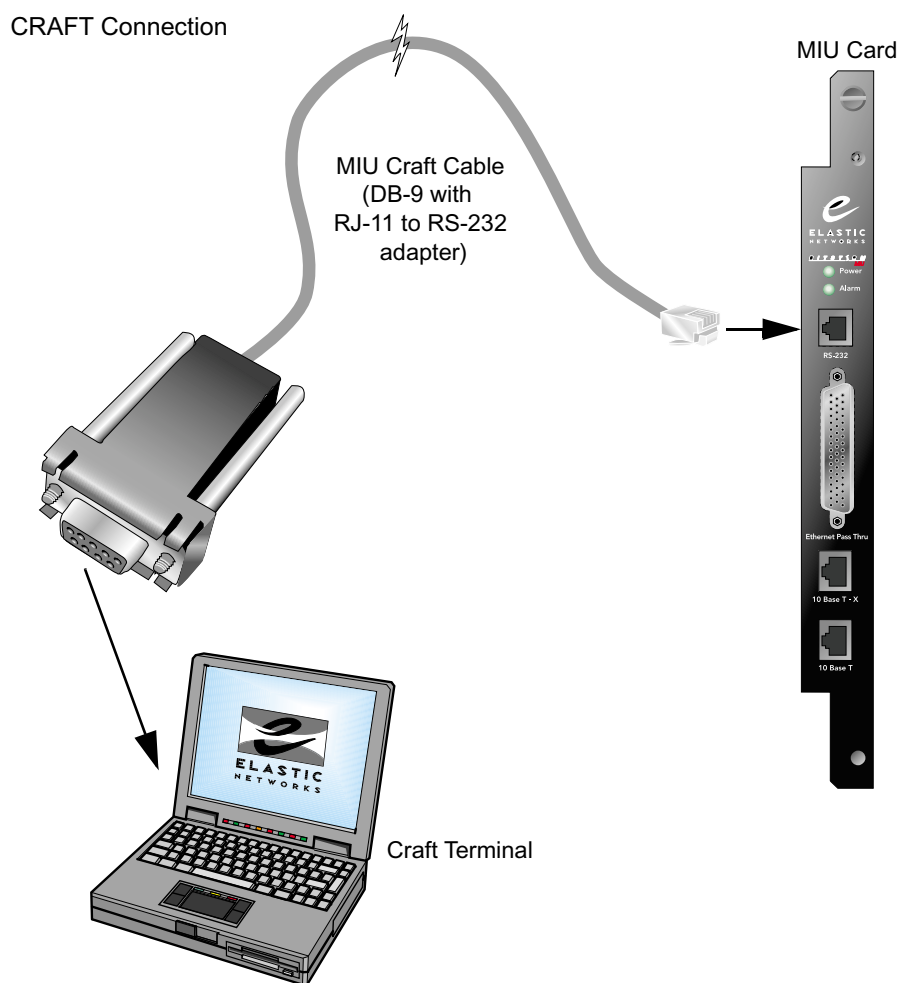
Complete the following steps to configure the MIU.

Step	Procedure
-------------	------------------

- | | |
|-----|---|
| 1.) | Ensure that the BitStorm 1900 Access Multiplexer is powered up. |
| 2.) | Verify the PC has an ASCII terminal emulator loaded (i.e., Hyper-terminal software, etc.). |
| 3.) | Connect the PC to the MIU card using the MIU Craft Cable (RS-232 to RJ-11 adapter and telephone cable) as shown in <i>Figure 2-23, "Craft Connection with the MIU Craft Cable,"</i> on page 96. <ul style="list-style-type: none">a.) Connect the DB-9 end of the cable to the serial COM port on the PC.b.) Connect the RJ-11 connector to the RS-232 jack on the MIU card. |

Step	Procedure	cont.
-------------	------------------	--------------

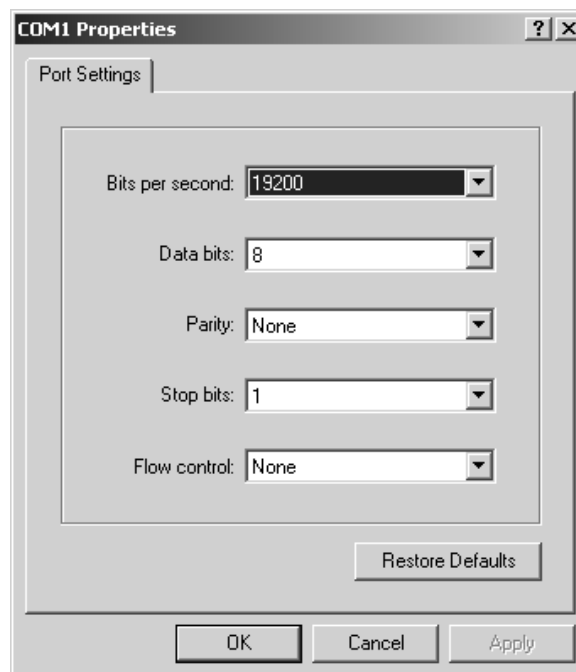
Figure 2-23: Craft Connection with the MIU Craft Cable



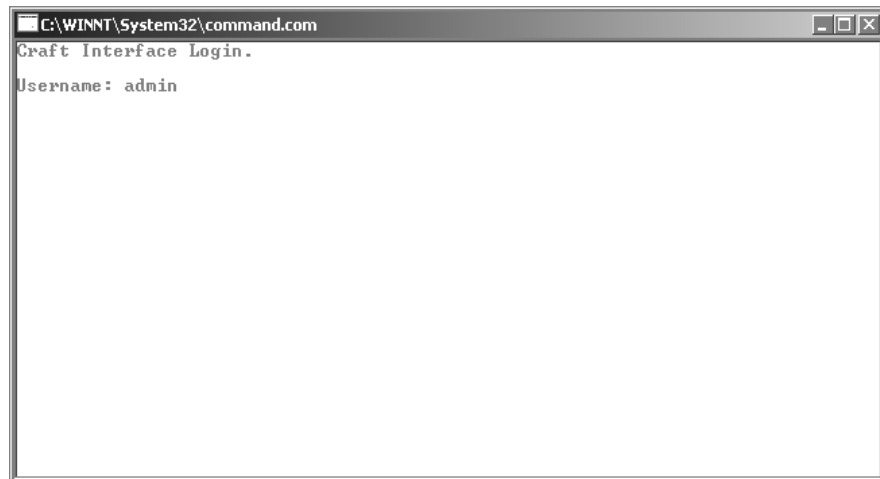
Step	Procedure	cont.
-------------	------------------	--------------

- 4.) Set the serial COM1 port terminal communication settings.
- a.) Initiate a Terminal Session using terminal emulation software (i.e., Hyperterminal).
 - b.) Select the appropriate serial *COM* port from the pull down menu (i.e., COM1, COM2, etc).
 - c.) Verify the port settings are the same as shown in Figure 2-24, "COM Port Settings." and click **OK**.

Figure 2-24: COM Port Settings



Step Procedure

cont.

- 5.) The *Craft Interface Login* screen displays. Type **admin** for the default *Username* and press **<Enter>**.

NOTE: The Craft Interface is case-sensitive. Make sure to type all entries in lowercase.

The following screen displays requiring a *Password* to continue:



- 6.) Type **etherloop** and press **<Enter>**. (The user name and password can be changed after the initial login).

Step	Procedure	cont.
-------------	------------------	--------------

The *BS1900MIU>>* prompt displays:

- 7.) For list of all available CLI commands, type **help** at the *BS1900MIU>>* prompt and press **<Enter>**.

```

C:\WINNT\System32\command.com
Enter EXIT to escape...
BS1900MIU>>help

Available commands are:
CLEAR
CLS
DATE
HELP
IFCONFIG
MENU
PING
RESET
SNMP
SYSINFO
TIME
VERSION

Type HELP <command name> for more information.
BS1900MIU>>
  
```

This screen provides a list of the available commands to configure the MIU. Refer to the following table for a description of each command.

Table 2-4: CLI (Command Line Interface) Commands


CLI Commands	
Command	Description
CLEAR	Enter to clear the screen of data leaving only the BS1900MIU>> prompt. 
CLS	This command is the same as CLEAR.

Table 2-4: CLI (Command Line Interface) Commands


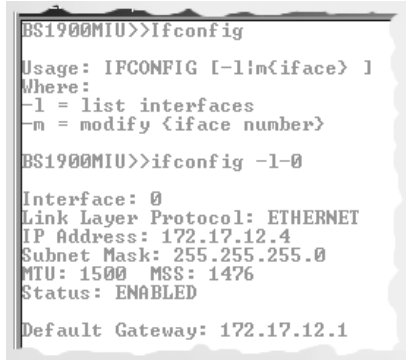
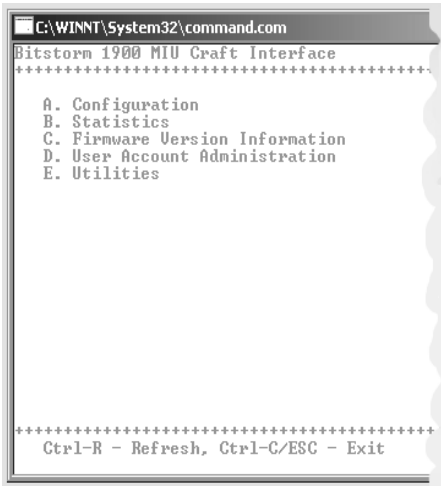
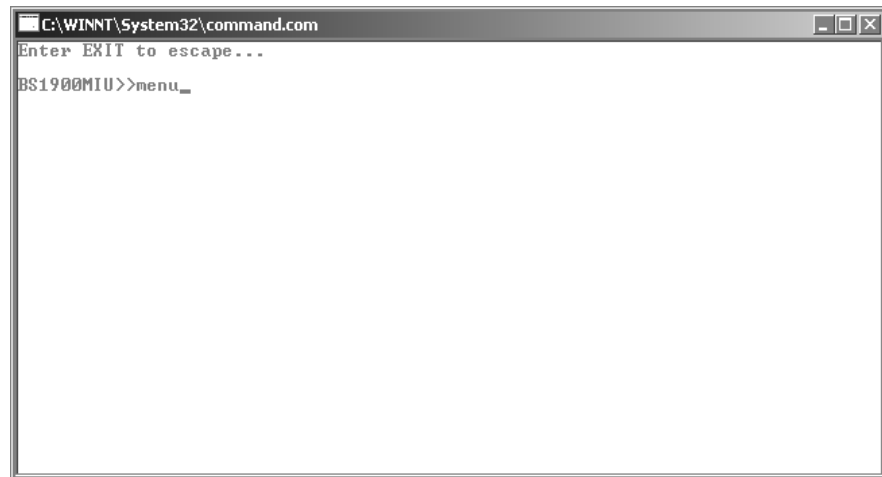
CLI Commands	
Command	Description
DATE	<p>Enter to change the date.</p>  <pre>BS1900MIU>>Date Use -s to set the system date. Current System Date is: 09/06/2001</pre>
HELP	Enter to obtain additional help
IFCONFIG	<p>Use to configure the MIU I.P. Address, Subnet Mask, Status, Default Gateway etc.</p>  <pre>BS1900MIU>>ifconfig Usage: IFCONFIG [-l m{iface}] Where: -l = list interfaces -m = modify {iface number} BS1900MIU>>ifconfig -l-0 Interface: 0 Link Layer Protocol: ETHERNET IP Address: 172.17.12.4 Subnet Mask: 255.255.255.0 MTU: 1500 MSS: 1476 Status: ENABLED Default Gateway: 172.17.12.1</pre>
MENU	<p>Enter to view the Main Menu for the interface.</p>  <pre>C:\WINNT\System32\command.com Bitstorm 1900 MIU Craft Interface ***** A. Configuration B. Statistics C. Firmware Version Information D. User Account Administration E. Utilities ***** Ctrl-R - Refresh, Ctrl-C/ESC - Exit</pre>

Table 2-4: CLI (Command Line Interface) Commands

CLI Commands	
Command	Description
PING	<p>Enter to verify if an I.P. Address is valid.</p> <pre> BS1900MIU>>ping Usage: PING [-n count] [-s size] [-t timeout] [-i TTL] [-v TOS] [-f] [-d] destination Where: count = number of ping attempts size = data packet size (32 bytes is the default) timeout = time to wait on each PING before giving up. TTL = time to live. TOS = type of service. The -f option specifies to set the 'Don't Fragment' (DF) flag in the packet. The -d option specifies to continue pinging until stopped by CTRL-C -Destination specifies a valid IP address. </pre>
RESET	<p>Use to Reset or Reboot the system.</p> <pre> BS1900MIU>>reset This will completely RESET the system. Are you sure? (y/n): _ </pre> <p><i>(It is not advised to power down the system in order to perform a reset of the system.)</i></p>
SNMP	<p>Enter to review and/or modify the current SNMP configuration.</p> <pre> BS1900MIU>>snmp Usage: SNMP [-l m] Where: -l = list current configuration -m = modify configuration </pre>
SYSINFO	<p>Enter to access and review system information.</p> <pre> BS1900MIU>>sysinfo Usage: SYSINFO [-t!m!o] Where: -t = list current tasks. -m = list memory. -l = list loading information. -r = list reset/alert/uptime information. </pre>
TIME	<p>Enter to set the time.</p> <pre> BS1900MIU>>time Use -s to set the system time. Current System Time is: 15:17:36 </pre>
VERSION	<p>Enter to view the version of firmware currently loaded on the MIU.</p> <pre> BS1900MIU>>version Software version: ELASHELF_MIU1900_FW_02_00_04 -- BitStorm MIU </pre>

Step Procedure

cont.

- 8.) Type **menu** at the BS1900MIU>> prompt.

The *BitStorm 1900 MIU Craft Interface Main Menu* displays.



- 9.) Type **a** to select *Configuration*.

Step Procedure

cont.

```

C:\WINNT\System32\command.com
BitStorm 1900 MIU Configuration                                09/07/2001  14:05:42
*****
A. Network Interface Configuration
B. SNMP Configuration
C. Set Time-of-Day Clock

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit
  
```

- 10.) From the *Configuration Menu*, type **a** to access the *Network Interface Configuration* screen.

```

C:\WINNT\System32\command.com
Network Configuration                                          09/07/2001  14:10:04
*****
Ethernet IP Address: 172.317.312.004
Ethernet Subnet Mask: 255.255.255.000

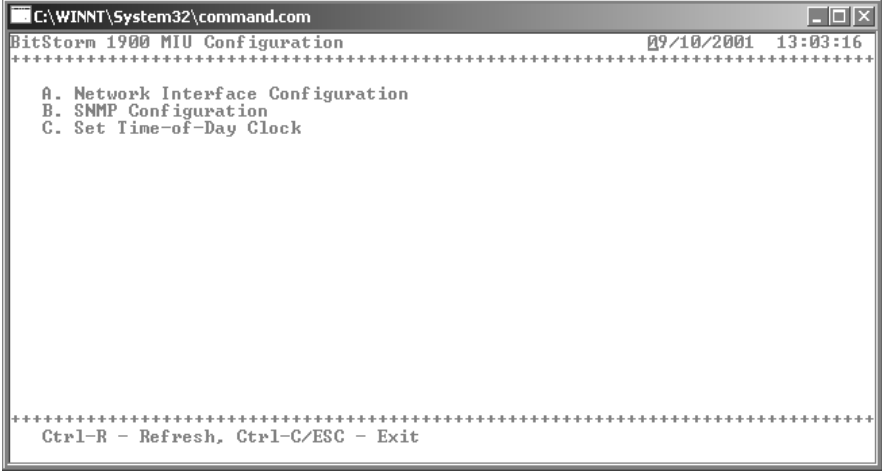
Default Gateway: 172.317.312.001

Shelf ID: 00 00 00 01

-----SYSTEM INFORMATION (Read Only)-----
FW Version: ELASHELF_MIU1900_FW_02_00_04
MAC Address: 0030520263AF

NOTE: Only top Ethernet port is supported! Bottom Ethernet port is inactive!
*****
Ctl-R - Refresh, Ctl-W - Write Fields, Ctl-C/ESC - Exit
TAB/Down Arrow - Next Field, Up Arrow - Previous Field
Right Arrow - Next Field Column, Left Arrow - Previous Field Column
Status:
  
```

- 11.) Type in the **MIU Ethernet IP Address**, **MIU Ethernet Subnet Mask**, **MIU Default Gateway**, and the **MIU Shelf ID**. Press **<CTRL>+W** to save the settings, then press **<Esc>**. The *Configuration Menu* will display.

Step Procedure**cont.**


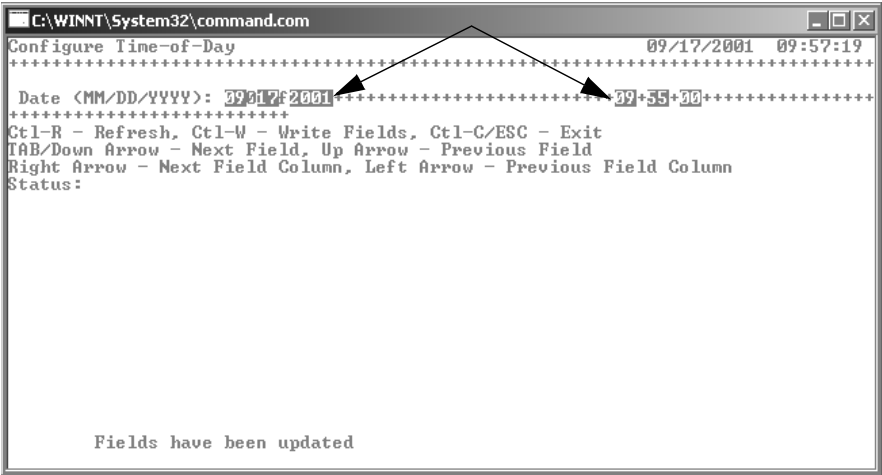
```

C:\WINNT\System32\command.com
BitStorm 1900 MIU Configuration                                09/10/2001 13:03:16
*****
A. Network Interface Configuration
B. SNMP Configuration
C. Set Time-of-Day Clock

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

- 12.) Type **c** to select *Set Time-of-Day Clock*. The following screen appears:



```

C:\WINNT\System32\command.com
Configure Time-of-Day                                         09/17/2001 09:57:19
*****
Date <MM/DD/YYYY>: 09017f2001*****09+55+30*****
*****
Ctl-R - Refresh, Ctl-W - Write Fields, Ctl-C/ESC - Exit
TAB/Down Arrow - Next Field, Up Arrow - Previous Field
Right Arrow - Next Field Column, Left Arrow - Previous Field Column
Status:

Fields have been updated

```

- 13.) Enter the current date and time.
- a.) Enter the current date in the format MMDDYYYY. [Enter only the numbers not the slashes (/). This screen is currently under construction. There will be a 0 and an f in place of the slash (/) between the numbers.]

Step	Procedure	cont.
-------------	------------------	--------------

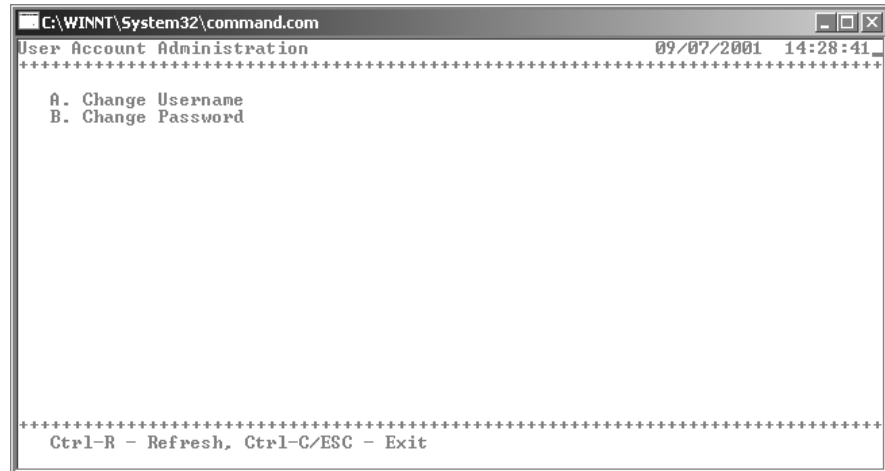
- b.) After entering the 4-digit year, the cursor will automatically jump to the Time field. (This field is not marked in this version.) Enter the time as HHMMSS (Do not type the colon (:)) between the numbers, plus signs (+) will separate the numbers.
- c.) Press <CTRL>+W to save the changes. Press <Esc> or <CTRL>+C to return to the *Configuration* screen, then press <Esc> or <CTRL>+C again to return to the *Main Menu* screen.



```
C:\WINNT\System32\command.com
Bitstorm 1900 MIU Craft Interface                                09/07/2001 13:23:54
*****
A. Configuration
B. Statistics
C. Firmware Version Information
D. User Account Administration
E. Utilities

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit
```

- 14.) To change user name and password settings, type **d** to select *User Account Administration*.

Step Procedure**cont.**

- 15.) Type **a** to select *Change Username* to modify the user name. The following screens display:



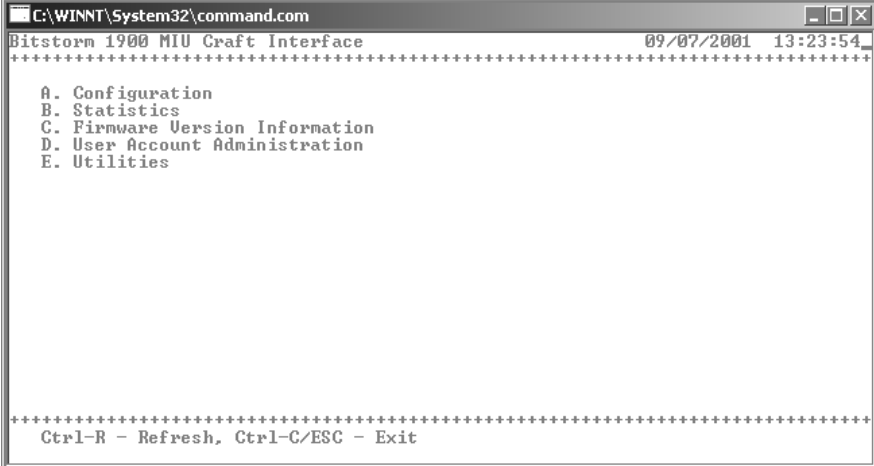
Step	Procedure	cont.
-------------	------------------	--------------

- | | | |
|------|--|--|
| 16.) | Type a new user name, then press <Enter> (a confirmation will follow indicating that the user name has been saved). Press any key to return to the <i>User Account Administration</i> screen. | |
| 17.) | Select <i>Change Password</i> to modify the password. The following screens display: | |



- | | | |
|------|--|--|
| 18.) | Type a new password, then press <Enter> . Re-enter the password when prompted. A confirmation will follow indicating that the password has been saved. Press any key to return to the Main Menu screen. | |
|------|--|--|

Step Procedure

cont.

A screenshot of a Windows command prompt window titled "C:\WINNT\System32\command.com". The window displays the "Bitstorm 1900 MIU Craft Interface" menu. The menu is enclosed in a border of asterisks. At the top right, the date and time "09/07/2001 13:23:54" are shown. The menu options are listed as follows:

```
A. Configuration
B. Statistics
C. Firmware Version Information
D. User Account Administration
E. Utilities
```

At the bottom of the window, a line of text reads: "Ctrl-R - Refresh, Ctrl-C/ESC - Exit".

- 19.) Once all of the configuration parameters are entered, the system must be reset for the changes to take effect. To reset the system, type **e** to select *Utilities* from the *Main Menu* screen.

Step Procedure

cont.

20.) Type **a** to select *Reset System*, and then **y** to confirm.

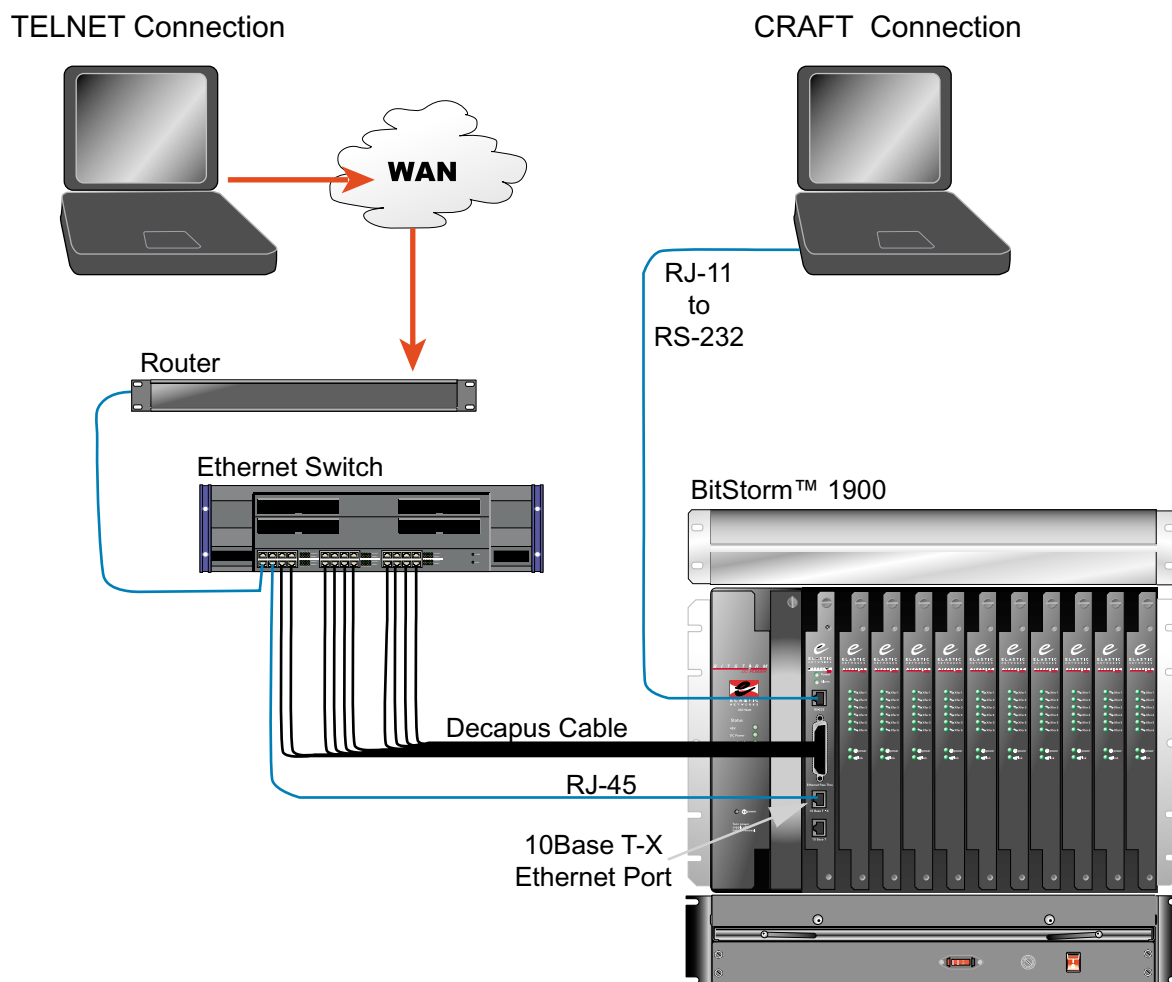


You have completed this task.

Task 014: Configuring Remote Management

The MIU can be remotely managed via the management 10Base T-X Ethernet port as shown in *Figure 2-25, "Telnet Connection for the BitStorm 1900."*

Figure 2-25: Telnet Connection for the BitStorm 1900



To access and configure the MIU SNMP function, clients will either use an SNMP Network Management Software solution (i.e., Elastic Networks' EMS 2.0, HP Open View, CastleRock's SNMPc, etc.) or Telenet into the MIU and use the CLI (Command Line Interface).

Using SNMP Network Management Software

If the client is using SNMP Network Management Software, Elastic Networks' private MIB must be loaded into the user's SNMP Network Manager using the procedure accompanying the specific Network Management Software.

A list of all supported MIBs and the Elastic Networks' private MIB can be found in "Appendix C: SNMP MIBs," on page 163 of this document. Elastic Networks' private MIBs can be downloaded from the Elastic Networks FTP site. Contact the Elastic Networks Customer Satisfaction organization for instructions on how to access the FTP site. Refer to *Table 4-1, "Customer Satisfaction Contact Information,"* on page 131.

Using Telnet for Remote Provisioning and Management

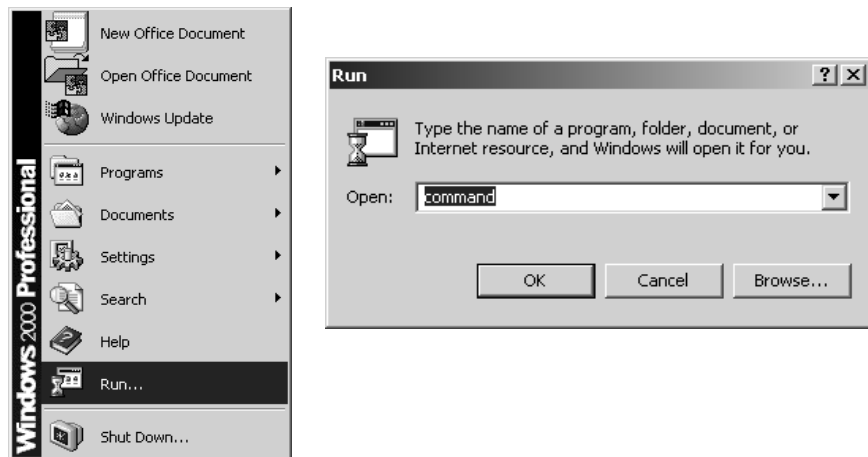
NOTE: Before using the Telnet option for remote management, the MIU must first be configured using the craft interface. This procedure is mandatory as an MIU I.P. address is required when accessing the MIU remotely.

The following steps and procedures are provided to aide in configuring the MIU and setting the traps. (This is intended as a brief overview. Refer to "Appendix C: SNMP MIBs," on page 163 for more detailed information.)

Step Procedure

- 1.) Initiate a Telnet session:
 - a.) From Windows, click on the **s t a r t** button, then select **R u n**.

Step Procedure

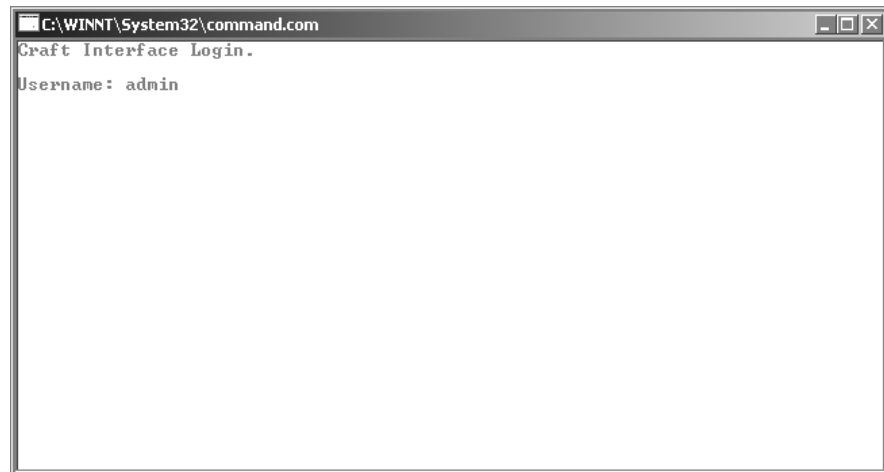
cont.

- 2.) Type **command** in the *Open*: field and click **OK**. The DOS prompt displays:



- 3.) At the DOS prompt type **telnet** and the **I.P. Address** for the MIU, then press **<Enter>**. The *Craft Inter-face Login* screen displays:

Step Procedure

cont.

- 4.) Type **admin** for the default *Username* and press **<Enter>**.

NOTE: The Craft Interface is case-sensitive. Make sure to type all entries in lowercase.



- 5.) Type **etherloop** for the default *Password* and press **<Enter>**.

Step Procedure

cont.

The *BS1900MIU>>* prompt displays:



```
C:\WINNT\System32\command.com
Enter EXIT to escape...
BS1900MIU>>version
Software version: ELASHELF_MIU1900_FW__02_00_04 -- BitStorm MIU
BS1900MIU>>_
```

- 6.) Type **version** to check the current firmware version. To verify this is the latest version, contact the Elastic Networks Customer Satisfaction organization. Refer to *Table 4-1, "Customer Satisfaction Contact Information,"* on page 131.
- 7.) Type **ifconfig -L-0** and press **<Enter>** and verify the current MIU configuration information.



```
C:\WINNT\System32\command.com
BS1900MIU>>ifconfig -L-0
Interface: 0
Link Layer Protocol: ETHERNET
IP Address: 172.17.12.4
Subnet Mask: 255.255.255.0
MTU: 1500 MSS: 1476
Status: ENABLED
Default Gateway: 172.17.12.1
BS1900MIU>>
```

Step	Procedure	cont.
-------------	------------------	--------------

- 8.) If any of the information needs to be modified, type:

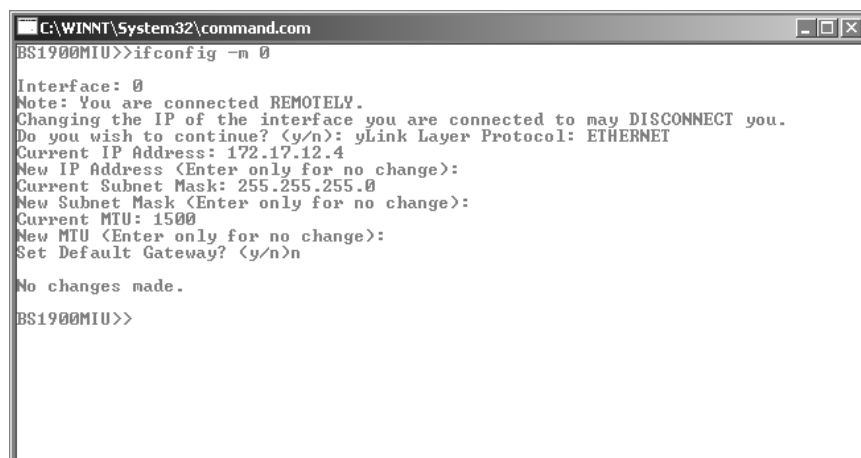
ifconfig -m 0 and press **<Enter>**.



```
C:\WINNT\System32\command.com
BS1900MIU>>ifconfig -m 0

Interface: 0
Note: You are connected REMOTELY.
Changing the IP of the interface you are connected to may DISCONNECT you.
Do you wish to continue? <y/n>: _
```

- 9.) The screen above displays indicating you are connected remotely to the MIU and asks if you would like to change the *IP* address of the MIU. Press **y**.



```
C:\WINNT\System32\command.com
BS1900MIU>>ifconfig -m 0

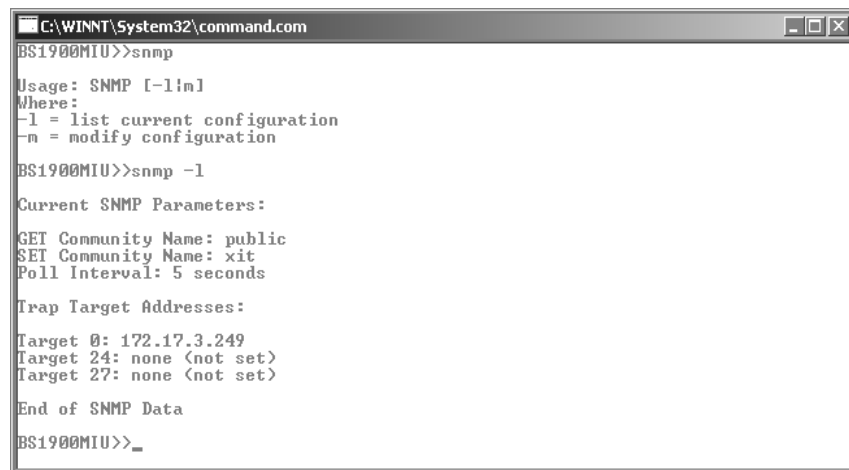
Interface: 0
Note: You are connected REMOTELY.
Changing the IP of the interface you are connected to may DISCONNECT you.
Do you wish to continue? <y/n>: yLink Layer Protocol: ETHERNET
Current IP Address: 172.17.12.4
New IP Address <Enter only for no change>:
Current Subnet Mask: 255.255.255.0
New Subnet Mask <Enter only for no change>:
Current MTU: 1500
New MTU <Enter only for no change>:
Set Default Gateway? <y/n>n

No changes made.
BS1900MIU>>
```

- 10.) From this screen changes to the I.P. Address, Current Subnet Mask, MTU, and Set Default Gateway can be made. If there is no change, press **<Enter>** to continue to the next item. Do not change the MTU or MSS settings.

Step	Procedure	cont.
-------------	------------------	--------------

- 11.) To view the current SNMP parameters, type **snmp -l** and press **<Enter>**.



```
C:\WINNT\System32\command.com
BS1900MIU>>snmp
Usage: SNMP [-l|m]
Where:
-l = list current configuration
-m = modify configuration
BS1900MIU>>snmp -l
Current SNMP Parameters:
GET Community Name: public
SET Community Name: xit
Poll Interval: 5 seconds
Trap Target Addresses:
Target 0: 172.17.3.249
Target 24: none <not set>
Target 27: none <not set>
End of SNMP Data
BS1900MIU>>_
```

- 12.) Verify the correct *Community Name*, *Poll Intervals*, and *Trap Target Addresses*.
- 13.) To edit the SNMP configuration information type **snmp -m 0**.

Step Procedure**cont.**

```

C:\WINNT\System32\command.com
Old GET Community Name: private
New GET Community Name: public

Old SET Community Name: private
New SET Community Name: public

Current Poll Interval: 5
New Poll Interval <5-60, 0=no polling>: 5 <unchanged>

Set Trap Targets? <y/n>y
Use 0.0.0.0 to disable a target.

Current Target 0: 172.17.3.248
New Target 0: 172.17.3.249

Current Target 1: 172.17.12.4
New Target 1: 172.17.12.87

Current Target 2: 172.17.3.249
New Target 2: 172.17.3.248

Updating Parameters...Done.
BS1900MIU>>

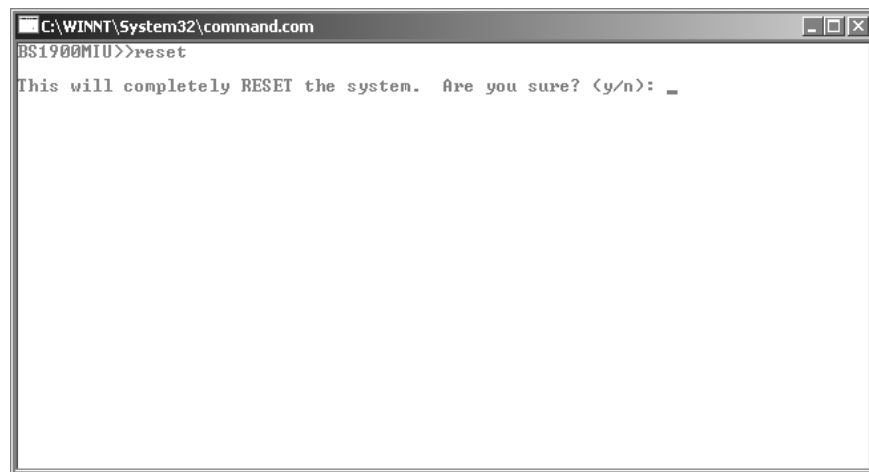
```

- 14.) From this screen changes to the *Community Name*, *Current Poll Interval*, and *Set Trap Targets* can be made. Refer to the following table as a guide for these settings. If there are no changes, press **<Enter>** to continue to the next item.

Setting	Description
Community Name	<p>The <i>Community Name</i> is used by SNMP V1 as a minimum security control tool much like a user ID and/or password.</p> <ul style="list-style-type: none"> For this field, enter an identifier of up to 15 alpha characters.
Current Poll Interval	<p>The <i>Current Polling Interval</i> provides the ability to set the poll interval in number of seconds. The SNMP Agent polls the modems every <u>n</u> seconds for trap conditions (alarms). (n=how often the equipment is polled.)</p> <ul style="list-style-type: none"> The acceptable range is 5 to 60 seconds (inclusive). To disable the polling, set the poll interval to 0.
Set Trap Targets	<p><i>Set Trap Targets</i> is used to set the IP Address of the Network Management Stations where the SNMP Traps are designated to.</p> <ul style="list-style-type: none"> Up to 3 Trap Targets can be set.

Step	Procedure	cont.
-------------	------------------	--------------

- 15.) If changes to the configuration have been made, the system must be reset. Type **reset** and press **<Enter>**, then **y** to confirm.



NOTE: When logging back into the MIU, the new IP Address must be entered.

Refer to *Table 2-4, "CLI (Command Line Interface) Commands,"* on page 99, for additional CLI commands for remote management. Also, refer to the *Appendix C* section entitled, "*Craft Interface Screens*," on page 191 for additional information.



You have completed this task.

Task 015: Testing the BitStorm 1900 Installation

Testing a BitStorm 1900™ Access Multiplexer installation includes the following tasks:

- Testing voice connectivity
- Testing data connectivity
- End-to-end connectivity

The following sections contain testing-related information followed by the BitStorm 1900 testing tasks. Testing tasks for network support equipment such as LAN/WAN routers are not included in this document.

BitStorm Access 1900™ Multiplexer Testing Locations

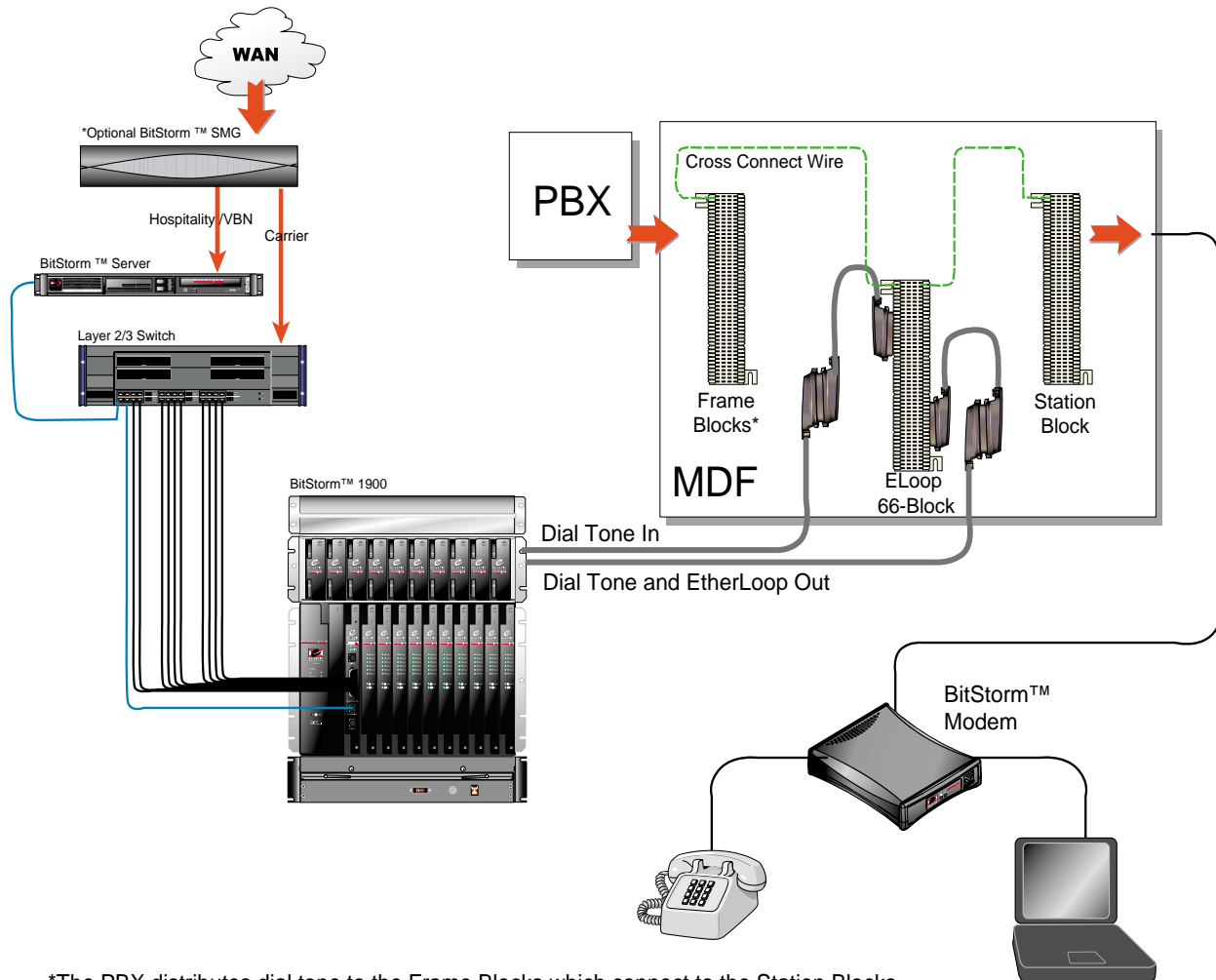
Primary test points for installation include the following:

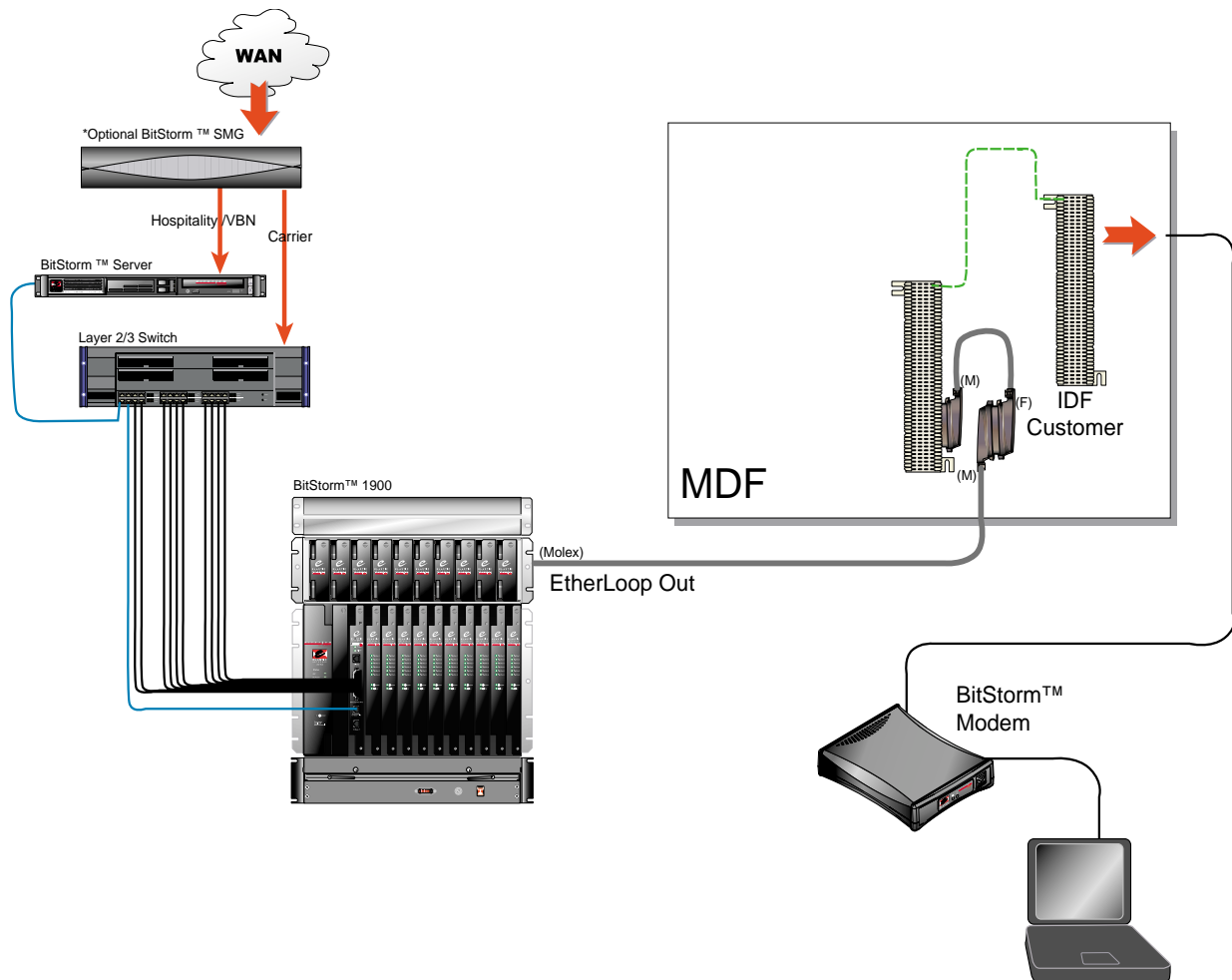
- Customer premise cross-connect containing the connections for the BitStorm 1900 and customer premise equipment
- Modem user locations

If the system is having trouble, other test points may be required.

Step Procedure

- 1.) Review the BitStorm 1900 Test Point Diagrams as follows:
 - *Figure 2-26, "Voice/Data System Test Points," on page 120* shows the schematic layout and primary test points of a BitStorm 1900 voice/data system.
 - *Figure 2-27, "Data-only System Test Points," on page 121* shows the schematic layout and primary test points of a BitStorm 1900 data-only system.

Step Procedure**cont.****Figure 2-26: Voice/Data System Test Points**

Step Procedure**cont.****Figure 2-27: Data-only System Test Points****You have completed this task.**

Task 016: Testing Voice Connectivity

This procedure checks the voice connectivity in BitStorm 1900 voice/data applications.

Requirements

The following is required to do this procedure:

- External voice facility point-of-presence equipment installed
- Tip/Ring assignments
- Standard telecommunications hand-test telephone set

Step Procedure

- 1.) Identify the voice line being tested. Turn on the BitStorm 1900™ Access Multiplexer.
- 2.) Connect the hand test set Tip and Ring testers to the Tip/Ring pair at the customer premise cross-connect.
- 3.) Test for dial tone. A successful test indicates that voice service is passing through the filter shelf.
- 4.) If no dial tone is present, refer to “Chapter 3 BitStorm 1900 Maintenance” on page 127, for troubleshooting information.



You have completed this task.

Task 017: Testing Data Connectivity

This procedure checks data connectivity from the customer premise distribution frame and the BitStorm 1900 Access Multiplexer shelf.

Requirements

A StormPort Modem with power adapter and extension cord (if necessary) is required for this procedure.

Step Procedure

- 1.) Identify the data connections being tested at the EtherLoop cross-connect block and the Modem card on the BitStorm 1900 shelf.
- 2.) Install and connect the modems on the corresponding lines at the customer premise locations.
- 3.) Connect power to the modem.
- 4.) Turn on the BitStorm 1900.
- 5.) Observe the modem and BitStorm 1900 Modem card LEDs. After about 4-5 minutes, all LEDs at both the BitStorm 1900 and CPE locations should be green, with the transfer LEDs flickering.



You have completed this task.

Task 018: EtherLoop End-to-end Testing

This procedure checks the EtherLoop system installation, including simultaneous voice and data EtherLoop tests from the modem to the voice and data networks.

Requirements

The EtherLoop end-to-end system testing requires the following:

- Modem installed and powered
- Data network equipment installed and configured, including connection from EtherLoop to Internet, Intranet or LAN
- User room telephone or telephone test set with RJ-11 connection to the StormPort modem
- Ethernet 10Base-T cable with RJ-45 terminations
- Laptop personal computer equipped with the following:
 - Ethernet PC card configured for TCP/IP
 - Ethernet PC card RJ-45 adapter cable
 - Internet browser application, either *Internet Explorer* 4.0 (or higher) or *Netscape Navigator* 3.0/4.0 (or higher)

Step Procedure

- 1.) Identify the modem pair being tested.
- 2.) Verify dial tone on the room phone.
- 3.) If the laptop is running, shut it down.
- 4.) Connect the Ethernet PC card RJ-45 adapter cable to the Ethernet PC card.
- 5.) Connect one RJ-45 plug of the Ethernet cable to the PC card RJ-45 adapter, and the other end to the "To PC" RJ-45 port on the StormPort modem.
- 6.) Start the laptop, and launch the browser application.

Step	Procedure	cont.
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NOTE: The browser application must be configured for "no proxies." Refer to "Chapter 3 BitStorm 1900 Maintenance" on page 127 for more information."

- 7.) In the browser application, enter the IP address of a known, working site on your network or on the Internet. Repeat this step for several sites.
- 8.) Once data connectivity has been established in step 7, verify dial tone again on the room phone.
- 9.) If the voice or data connectivity fails, refer to "Chapter 3 BitStorm 1900 Maintenance" on page 127.



You have completed this task.

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3 BitStorm 1900 Maintenance

This chapter contains guidelines and checklists for the maintenance of the BitStorm 1900 system.

Maintenance Guidelines

The following factors can cause service problems in an EtherLoop system installation:

- Poor wiring conditions
- Incomplete cable connections
- Improper BitStorm 1900 equipment installation
- Improper data network equipment configuration
- Equipment failure

The following sections briefly describe each of these potential problem causes.

Wiring Conditions

In general, EtherLoop systems can function well on standard, twisted pair phone lines (Category 3 or better). However, in older facilities, extremely poor wiring conditions may exist that can adversely impact EtherLoop performance. Also, RJ-11 wall jack connectors can become corroded, which may not impact voice service other than generating some static on the line, but can interfere with EtherLoop data service.

Cable Connections

It is important to ensure that all connections to the EtherLoop system are firmly seated and secured. An incomplete connection at any one point could cause the EtherLoop system to malfunction.

BitStorm 1900 Equipment Installation

BitStorm 1900 equipment is relatively simple to install. However, if an equipment card is installed in the wrong slot, or if the cards are not firmly seated in their backplane connectors, the EtherLoop system will not function.

Data Network Equipment Configuration

For an EtherLoop system to function, the data network supporting the system must be properly configured. For example, IP addresses must be correct, and the network router must be configured properly.

Equipment Failure

LEDs on the BitStorm 1900 shelf and on the modem indicate if any equipment failures have occurred in the EtherLoop system.

Maintenance Checklists

Voice/Data Connectivity Troubleshooting Checklist

Table 3-1: Voice/Data Connectivity Maintenance in Facility Room

Problem	Maintenance Check
No voice or data service	<ul style="list-style-type: none"> • Verify that the correct Tip/Ring pairs are being tested for both voice and data • Verify power at all points in the system • Check jumper connections at all cross-connects • Verify connections and wiring conditions at all points
Voice but no data service	<ul style="list-style-type: none"> • Verify that the correct Tip/Ring pairs are being tested for both voice and data • Check jumper connections • Check LEDs at intermediate hub or InterProxy/router connections • Check for 10Base-T cable damage • Verify that Modem card is present in correct slot and fully seated in BitStorm 1900 Access Multiplexer backplane connection • Replace Modem card to check for bad card • Verify that the MIU Shelf Processor is in correct slot and fully seated in the BitStorm1900 Access Multiplexer backplane connection • Replace Hub card to check for bad card
Data but no voice service	<ul style="list-style-type: none"> • Verify that the correct Tip/Ring pairs are being tested for both voice and data • Check jumper connections at PSTN/PBX cross-connect • Check dialtone at the PSTN/PBX cross-connect to verify that there is not an external voice network problem • Verify that Filter card is present in correct slot and fully seated in the Filter Shelf • Replace Filter card to check for bad card

End-to-end Maintenance Checklist

Table 3-2: End-to-end Maintenance Checklist

Problem	Check
No voice or data service	<ul style="list-style-type: none"> • Verify power at all points in the system • Verify connections and wiring conditions at all points
Voice but no data service	<ul style="list-style-type: none"> • Verify that there is not an external network problem such as a server being down • Verify that the Ethernet card on the PC connected to the modem has been configured • Verify that the correct type of Ethernet cable ("straight" or "crossover") is being used for the application. • Verify that the green LEDs at the various Ethernet connection points are lit • Check for 10Base-T cable damage • Verify router configuration and installation • See the checklist in <i>Table 3-1, "Voice/Data Connectivity Maintenance in Facility Room,"</i> on page 129.
Data but no voice service	<ul style="list-style-type: none"> • Check dialtone at the PSTN/PBX cross-connect to verify that there is not an external voice network problem • Check/replace filter card in filter shelf

4 Customer Satisfaction Information

Elastic Networks is committed to providing superior customer satisfaction in both our products and services to customers. For customers interested in obtaining information on products and the services offered, refer to the *Customer Satisfaction Contact Information* listed below or visit our website at www.elastic.com.

Customer Satisfaction Contact Information

Table 4-1: Customer Satisfaction Contact Information

Country	Telephone Number
USA/Canada	1-877-ETHERLP (1-877-384-3757)
China	10.800.120.0371
Hong Kong	800.900.234
Korea	007.981.4800.4571
Singapore	800.120.3503

Sales

Elastic Networks next generation DSL hardware and software solutions are available through our network of authorized resellers and service providers. Technical support is available through our certified Installation and service partners. To speak with an Elastic Networks sales representative, call 678-297-3100 or e-mail insidesales@elastic.com.

Training

Training is offered via instructor-led courses at the Elastic Networks' corporate training center in Alpharetta, Georgia, USA. Training is performed on-site at customer locations as requested.

All Elastic Networks' Partners are required to be certified through attending the required training program(s). For more information on training, including schedules and rates, visit the Elastic Networks' website at www.elastic.com. Select "[the Opportunities](#)" from the main menu and then select "[Training](#)." You may also access "Training" by typing in the URL: <http://www.elastic.com/w100/w150/w150.html>.

Technical Assistance & Support (TAS)

"Level 3," on-call technical support and assistance is provided for *certified partners and resellers only* during normal business hours:

**Monday - Friday, 8:30a.m. to 5:00p.m., Eastern Time, USA,
(excluding holidays)**

For a definition of "Level 3" support and assistance, please consult your individual reseller agreement. Technical assistance is not provided by Elastic Networks to end-users.

Warranty & Return Material Authorization (RMA)

Specific product warranties are outlined in individual reseller agreements. RMA's for resellers are handled through the TAS Hotline. Refer to *Table 4-1, "Customer Satisfaction Contact Information," on page 131* for the telephone number in your area, or e-mail Tech-Help@elastic.com.

RMAs are not provided by Elastic Networks to end-users.

Appendix A: Installation Requirements

This appendix describes the facility requirements for the BitStorm 1900 shelf and filter shelf.

BitStorm 1900 Support Equipment

Equipment and materials that must be installed to support the BitStorm 1900 shelf include the following:

- Telecommunications bay/rack to support the BitStorm 1900 shelf and the filter shelf (if applicable)
- -48 V DC or 110 V AC power supply
- -48 Vdc or 110/220 V AC Fan Shelf (if applicable)
- Grounding facility
- Network support equipment

The following sections list the specifications and requirements for each of these components.

Bay Requirements and Specifications

The bay containing the BitStorm 1900 shelf must meet the following requirements:

- The equipment bay must be capable of supporting the BitStorm 1900 weight and dimensions. Elastic Networks recommends a standard 19-inch wide x 7-foot tall bay intended for use with telecommunications equipment. A 23-inch wide telecommunications bay can be used with the appropriate 19-inch flange adapters.

- The bay must be installed and secured in accordance with standard telecommunications industry practices
- Use an Elastic Networks Isolation Kit to isolate the bay from building structures and outside elements for "in-building" installations (i.e., enterprise, MDU, and MTU).
- The bay must be electrically grounded according to standard telecommunications industry practices

BS1900 System Specifications

Table A-1, "BitStorm 1900 System Specifications" shows the power specifications for the BitStorm 1900 shelf.

Table A-1: BitStorm 1900 System Specifications

BitStorm 1900 System Specifications					
Description	Front Mount 4212 Full ¹	Front Mount 6306 Full ²	Front Mount 6224 Full ³	Front Mount 10306 Full ⁴	Front Mount 10224 Full ⁵
Lines Per Chassis	120 Lines, 4 Megabit	60 Lines, 6 Megabit	240 Lines, 6 Megabit	60 Lines, 10 Megabit	240 Lines, 10 Megabit
Weight	43.4 lbs.	50lbs.	46 lbs.	50lbs.	46 lbs.
Height	12.1875"	12.1875"	12.1875"	12.1875"	12.1875"
Width	12"	12"	12"	12"	12"
Required Rack Units	13	13	13	13	13
Depth	12"	12"	12"	12"	12"
Cabled Depth	16"	17.5"	17.5"	17.5"	17.5"
Cabled Ear to Front (Front Mount)	2.5"	4"	4"	4"	4"
Cabled Ear to Front (Mid Mount)	6.25"	7.75"	7.75"	7.75"	7.75"
Cabled Ear to Back (Mid Mount)	13.5"	13.5"	13.5"	13.5"	13.5"
Cabled Ear to Back (Mid Mount)	9.75"	9.75"	9.75"	9.75"	9.75"
Humidity (Non-Condensing)	1% to 90%	1% to 90%	1% to 90%	1% to 90%	1% to 90%
Ambient Temp. Rating	5°C to 40°C	5°C to 40°C	5°C to 40°C	5°C to 40°C	5°C to 40°C

Table A-1: BitStorm 1900 System Specifications

BitStorm 1900 System Specifications					
Description	Front Mount 4212 Full ¹	Front Mount 6306 Full ²	Front Mount 6224 Full ³	Front Mount 10306 Full ⁴	Front Mount 10224 Full ⁵
Altitude	-200 to 13,123'	-200 to 13,123'	-200 to 13,123'		
Connectors	<ul style="list-style-type: none"> • 2 Rows of Omni-Grid Connectors for Data Out • Rear Top Row- Left to Right: Cards 10-1, Lines 1-12 on each card • Rear Bottom Row- Left to Right: Cards 10-1, Lines 13-24 each card (6224 and 10224 Cards Only) • Rear Top Two right most connectors are not used in current configurations. • Mate-n-Lock Power Connector for DC Power Cards (Not used with AC) • Alarm Connector (Not Currently Used) • WAN Interface (WAN Card Specific- See Individual WAN Card Details) 				
Dependencies	Air Baffle	Air Baffle, Fan Tray	Air Baffle, Fan Tray		
Cable List	See Individual Cards	See Individual Cards	See Individual Cards		
Certifications	NEBS Level III	NEBS Level III	NEBS Level I		

¹ 4212 configuration assumes a full chassis consisting of a 70 Watt AC Power Card, Switch Card and 10-4212 CO Cards.

² 6306 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-6306 CO Cards.

³ 6224 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-6224 CO Cards.

⁴ 10306 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-10306 CO Cards.

⁵ 10224 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-10224 CO Cards.

Fan Trays

The fan shelf provides forced-air cooling in the 7RU modem chassis and 3RU filter chassis. The -48 V DC fan tray is ideal for the Central Office (CO) and the 110/220 V AC fan tray is geared toward the enterprise. Fan shelves are **required** for any chassis housing one or more 6 or 10 Mbps CO modem cards.

Grounding Environment Specifications

The grounding environment for the bay containing the BitStorm 1900 shelf must meet local electrical codes and Integrated Building Distribution Network (IBDN) standards. The grounding environment for the BitStorm 1900 shelf and its supporting bay can be either a Common

Bonding Network (CBN) or an Isolated Bonding Network (IBN) environment. Either of these environments may use a 1/0 AWG ground collector.

The following sections offer guidelines for each of these environments, with and without ground collectors. See local electrical codes or the appropriate IBDN standards for more information.

CBN Grounding Environment

In most facilities using the CBN environment, the bay containing the BitStorm 1900™ Access Multiplexer shelf should be grounded to a frame ground bar (FGB) as the common ground point using a 6 AWG, stranded, ground conductor. In smaller facilities where no FGB exists, the building principal ground (BPG) must be used.

If the facility has a ground collector, the bay must be grounded to the collector using a 6 AWG (stranded) ground conductor to the collector. The collector must then be grounded to the common ground point (FGB or BPG) using a 2 AWG (stranded) ground conductor.

If the distance from the FGB, BPG or ground collector is greater than 53 ft (16 m), a 2 AWG (stranded) ground conductor must be used to ground the bay.

IBN Grounding Environment

In most facilities using the IBN environment, the bay containing the BitStorm 1900 Access Multiplexer shelf should be grounded using a 6 AWG, stranded, ground conductor to the building single-point ground (SPG) as the common ground point. In smaller facilities where no SPG exists, the building principal ground (BPG) must be used.

If the facility has a ground collector, the bay must be grounded to the collector using a 6 AWG (stranded) ground conductor to the collector. The collector must then be grounded to the common ground point (SPG or BPG) using a 2 AWG (stranded) ground conductor.

If the distance from the SPG, BPG or ground collector is greater than 53 ft (16 m), a 2 AWG (stranded) ground conductor must be used to ground the bay.

Network Support Equipment

The network support equipment that may need to be installed includes the following:

- Ethernet 10 Base-T hub port for BitStorm 1900 Hub card connection (one per BitStorm 1900 Access Multiplexer shelf)
- Ethernet 10 Base-T hub ports for StormTracker/InterProxy (two per StormTracker)
- LAN router connections
- WAN gateway connection

Network support requirements will vary according to the existing facility resources. Elastic Networks suggests using a Site Survey Questionnaire to ensure all requirements are identified. Elastic Networks' Partners will find Hotel and Carrier Site Surveys on our Partner Only Site.

BS1900 Component Installation Requirements

Table A-2, "BitStorm 1900 Components" lists the component requirements for the BitStorm 1900.

Table A-2: BitStorm 1900 Components

Part#	BitStorm Component	Rules/Capacity
01-00039-10	BitStorm 1900 Shelf (empty)	10-CO Modem Cards 1-Power Card 1-MIU/Switch Card
06-00010-01	Blank Filler Card	1 included; 1 per empty modem slot Required w/Fan Tray
01-30013-01	DC, 250W Power Card	Powers 4212 w/Switch Card
01-00080-01	DC, 260W Power Card	Powers 6306 or 10306 w/MIU (Required w/MIU)
01-00060-01	AC, 70W Power Card	Powers 4212 w/Switch Card
01-00079-01	AC, 260W Power Card	Powers 6306 or 10306 w/MIU (Required w/MIU)

Table A-2: BitStorm 1900 Components

Part#	BitStorm Component	Rules/Capacity
01-00075-01	MIU Card w/Cable	1 per shelf
01-30011-01	Switch Card	1 per shelf
01-30067-01	4212 CO Modem Card	12-4 Mbps Stat-Mux EtherLoop Lines
01-00058-01	6306 CO Modem Card	6-6 Mbps Dedicated EtherLoop Lines
01-00092-01	6224 CO Modem Card	24-6 Mbps 24 Stat-Mux EtherLoop Lines; 12 ports per 6 Mbps modem
01-00153-01	10306 CO Modem Card	6-10 Mbps Dedicated EtherLoop Lines
01-00164-01	10224 CO Modem Card	24-10 Mbps 24 Stat-Mux EtherLoop Lines; 12 ports per 10 Mbps modem
01-20029-01	Filter Shelf, 3RU (empty)	10 filter cards; 120 filters 1 per BitStorm1900 w/ 4212; 1 per 2 BitStorm 1900 w/ 6306 or 10306 2 per BitStorm 1900 w/ 6224 or 10224
01-30036-01	Filter Card, 3RU	12 filters; 1 filter card per 4212 1 filter card per 2 6306 or 10306 2 filter card per 6224 or 10224
04-00007-10	Champ to Dual Omni Grid	2 per 2-4212 2 per 4-6306 or 10306 2 per 6224 or 10224
04-00008-18	Omni Grid to Dual Omni Grid	1 per 4212 2 per 6224 or 10224 w/ filter shelf
04-00028-01	Omni Grid to Dual Omni Grid	1 per 2-6306 or 10306 with filter shelf
03-00003-01	Air Baffle	1 per BitStorm 1900

Table A-2: BitStorm 1900 Components

Part#	BitStorm Component	Rules/Capacity
01-00085-01	Bulk Pack 5 Fan Tray Filters	Replace every 6 months (Required DC fan tray for NEBs compliance) DO NOT install a filter in an AC fan tray only the filter frame.
01-00084-01	DC Fan Tray	1 per BitStorm 1900 w/ MIU (An air filter must be installed to meet NEBs)
01-00084-02	AC Fan Tray	1 per BitStorm 1900 w/ MIU (DO NOT install an air filter, only the air filter frame.)

Installation Tools and Materials

The tools and materials required to install the BitStorm 1900 Access Multiplexer shelf include the following:

- 4-bay mounting screws
- 1-medium Phillips-head screwdriver
- 1-cross-connect block matching the existing blocks used in the facility MDF, such as Siemon R66, BIX, or AT&T 110 cross-connect blocks
- 1-wiring punch-down tool intended for use with the cross-connect block
- Cross-connect jumper wires (24-AWG, quantity varies) for tip/ring connections

BitStorm 1900 Physical Characteristics

This section specifies the physical dimensions and weight of the BitStorm 1900 and filter shelves

Table A-3, "BitStorm 1900 Weight and Dimensions" includes the shelf weight and dimensions.

Table A-3: BitStorm 1900 Weight and Dimensions

Specification	Weight (metric)
Weight (without cards)	19 lbs.
Weight (with cards)	43.4 lbs.
Height	12.1875 in.
Width	17.5 in.
Depth	12 in.

Installation Site Requirements

Equipment Location

The BitStorm 1900 Access Multiplexer should be isolated from other machinery and should have a minimum distance of 30 inches from UV lighting to prevent Electrostatic Discharge (ESD).

The BitStorm 1900 should not be installed in laundry rooms, workshops, janitorial closets, chemical storage sites, carpeted areas, or any other locations where potentially harmful airborne particles may be present.

Table A-4, "BitStorm Operational Requirements" includes the installation site requirements for the BitStorm 1900 shelf.

Table A-4: BitStorm Operational Requirements

Specification	Requirement
Local area network environment	TCP/IP over Ethernet
Power supply	-48 V DC nominal -46 to -56 V DC acceptable range or 110 V AC

Table A-4: BitStorm Operational Requirements

Specification	Requirement
Environmental	Operating temperature: 5°C (41°F) to 40°C (104°F) Relative Humidity: 1% to 90% Air quality should be good to excellent Electromagnetic emissions: Per FCC Part 15 Class A



WARNING: POSSIBLE EQUIPMENT DAMAGE! For compliance with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

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Appendix B: Cabling Specifications

This appendix contains the specifications for the cabling used with the 4212, 6306, 6224, 10306, and 10224 modem cards in the BitStorm 1900 shelf. The illustrations associated with each of the modem card cabling sections show typical rack layouts. (These configurations change according to the particular implementation needs of the customer.)

Cable Connections and Specifications

This section includes cable connections and specifications for the 4212, 6306, 6224, 10306 and 10224 modem cards using the Filter Shelf and Filter Blocks.

4212 Modem Card Cabling

Refer to *Figure B-1, "Cabling - Filter Shelf with 4212 Modem Cards," on page 144*, for 4212 cable connections using a filter shelf and 66-block. *Figure B-2, "Cabling - Filter 66-Block with 4212 Modem Cards," on page 145*, illustrates the connections for the 4212 modem card using a Filter 66-Block.

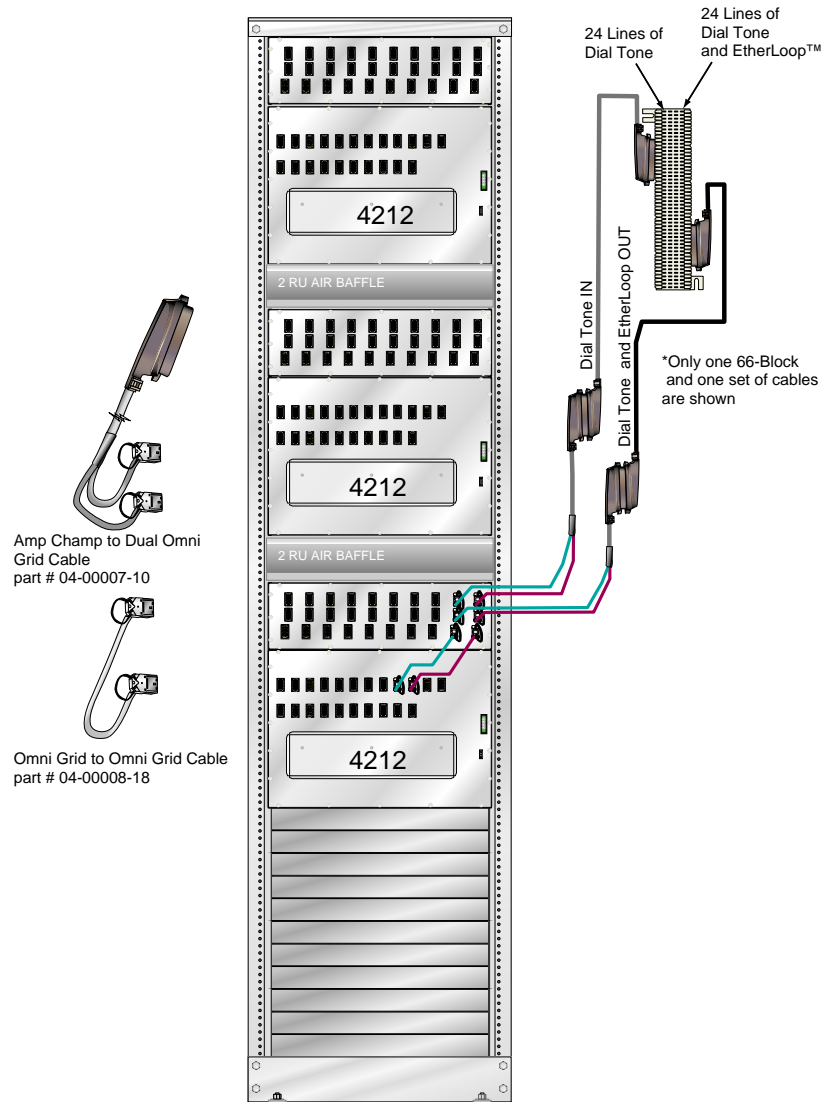
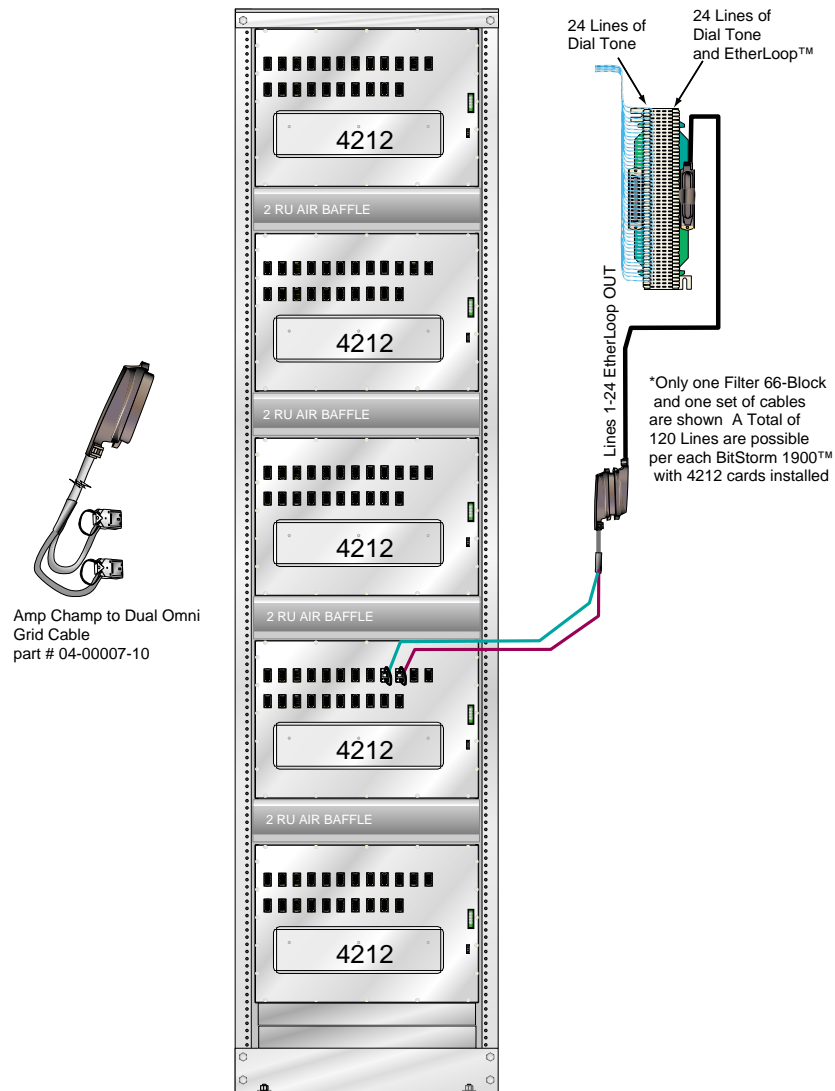
Figure B-1: Cabling - Filter Shelf with 4212 Modem Cards

Figure B-2: Cabling - Filter 66-Block with 4212 Modem Cards

6306 & 10306 Modem Card Cabling

Refer to *Figure B-3, "Cabling - Filter Shelf with 6306 or 10306 Modem Cards,"* on page 146, for the 6306 and 10306 cable connections using a filter shelf and 66-Block. *Figure B-4, "Cabling - Filter 66-Block with 6306 or 10306 Modem Cards,"* on page 147, illustrates the connections for the 6306 or 10306 modem card using a Filter 66-Block.

Figure B-3: Cabling - Filter Shelf with 6306 or 10306 Modem Cards

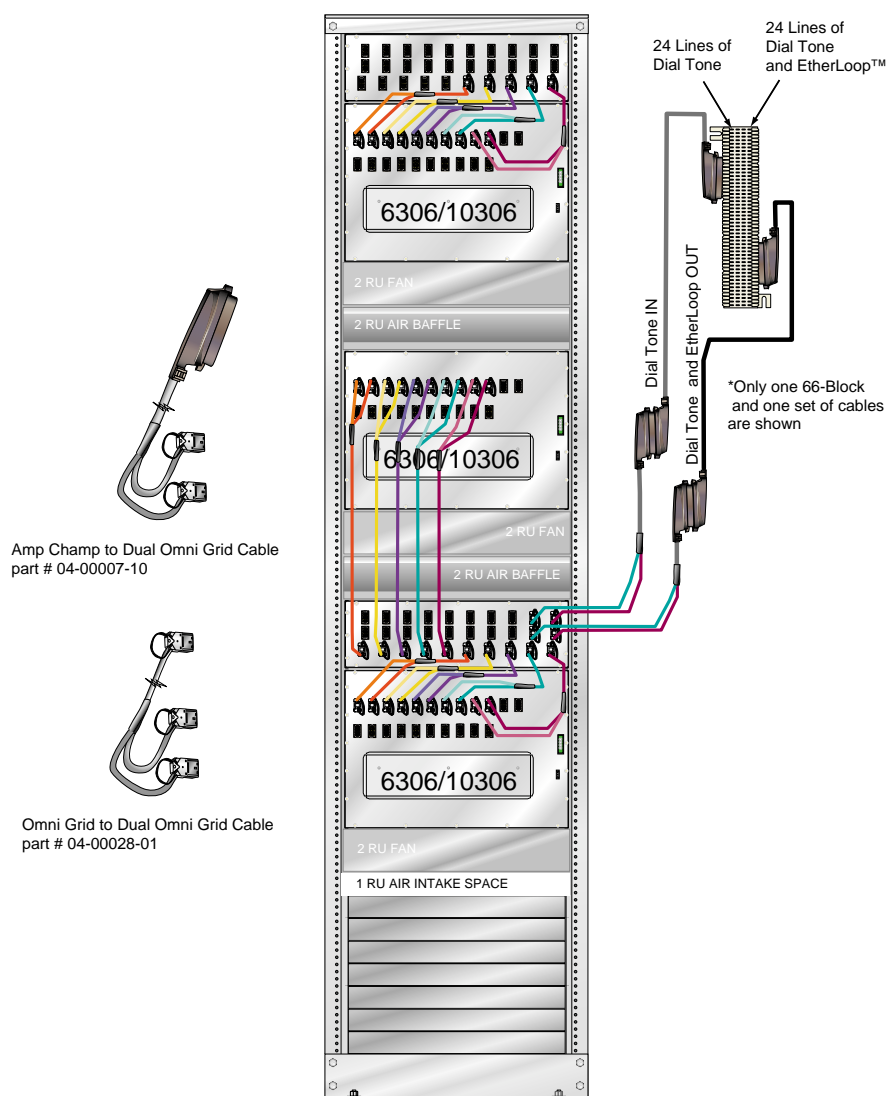
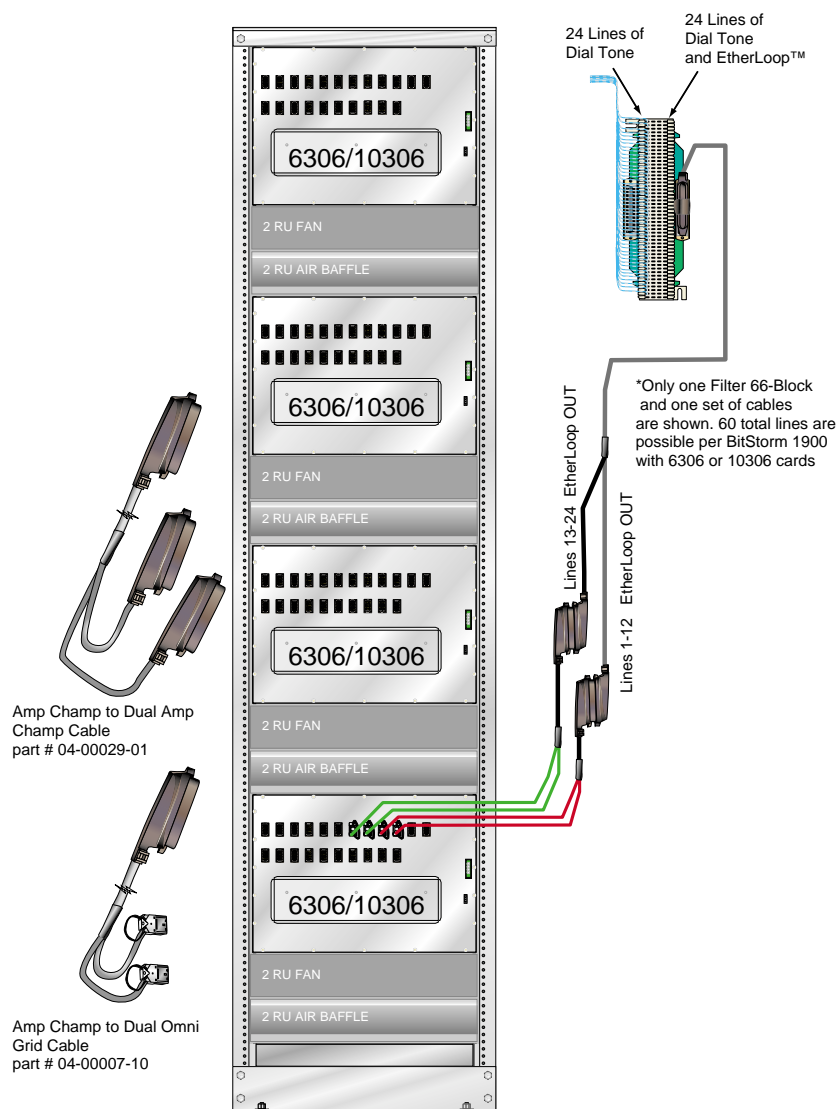


Figure B-4: Cabling - Filter 66-Block with 6306 or 10306 Modem Cards

6224 & 10224 Modem Card Cabling

Figure B-5, “Cabling - Filter Shelf with 6224 or 10224 Modem Cards,” on page 148, for 6224 and 10224 cable connections using a filter shelf and 66-Block. Figure B-6, “Cabling - Filter 66-Block with 6224 or 10224 Modem Cards,” on page 149, illustrates the connections for the 6224 or 10224 modem cards using a Filter 66-Block.

Figure B-5: Cabling - Filter Shelf with 6224 or 10224 Modem Cards

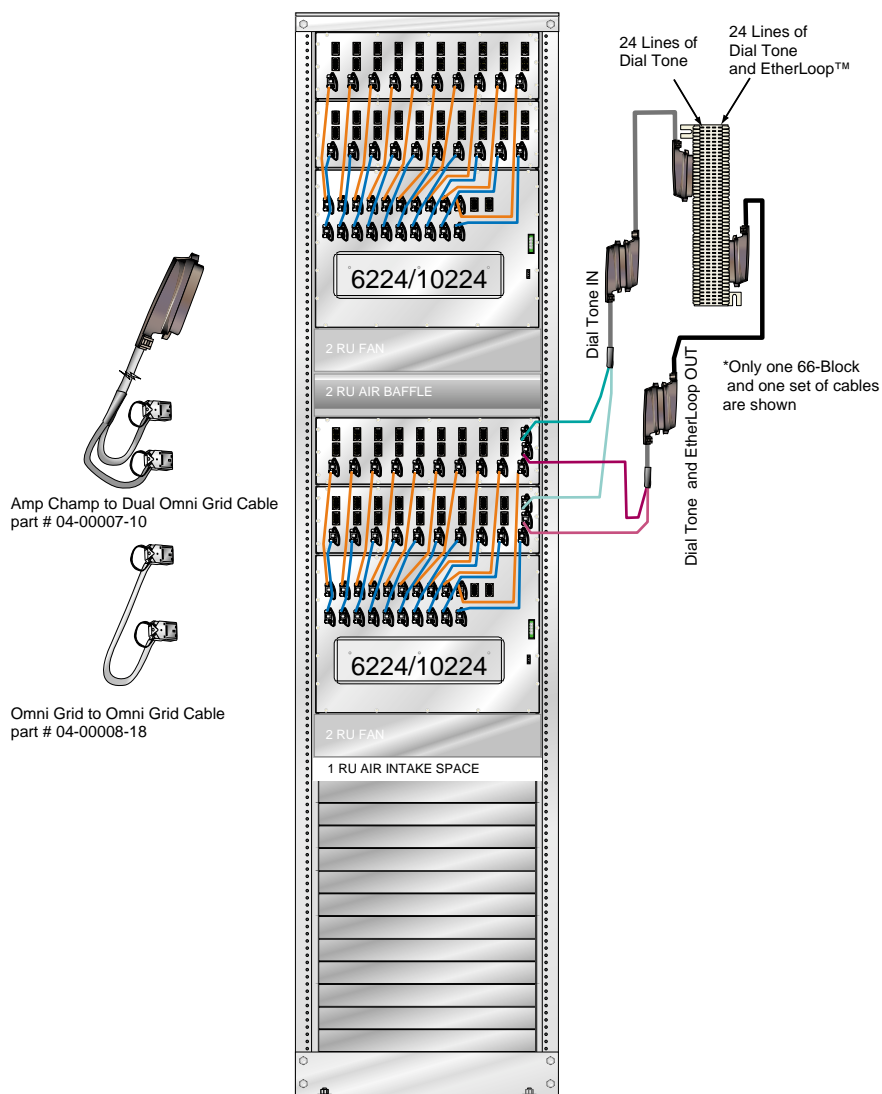
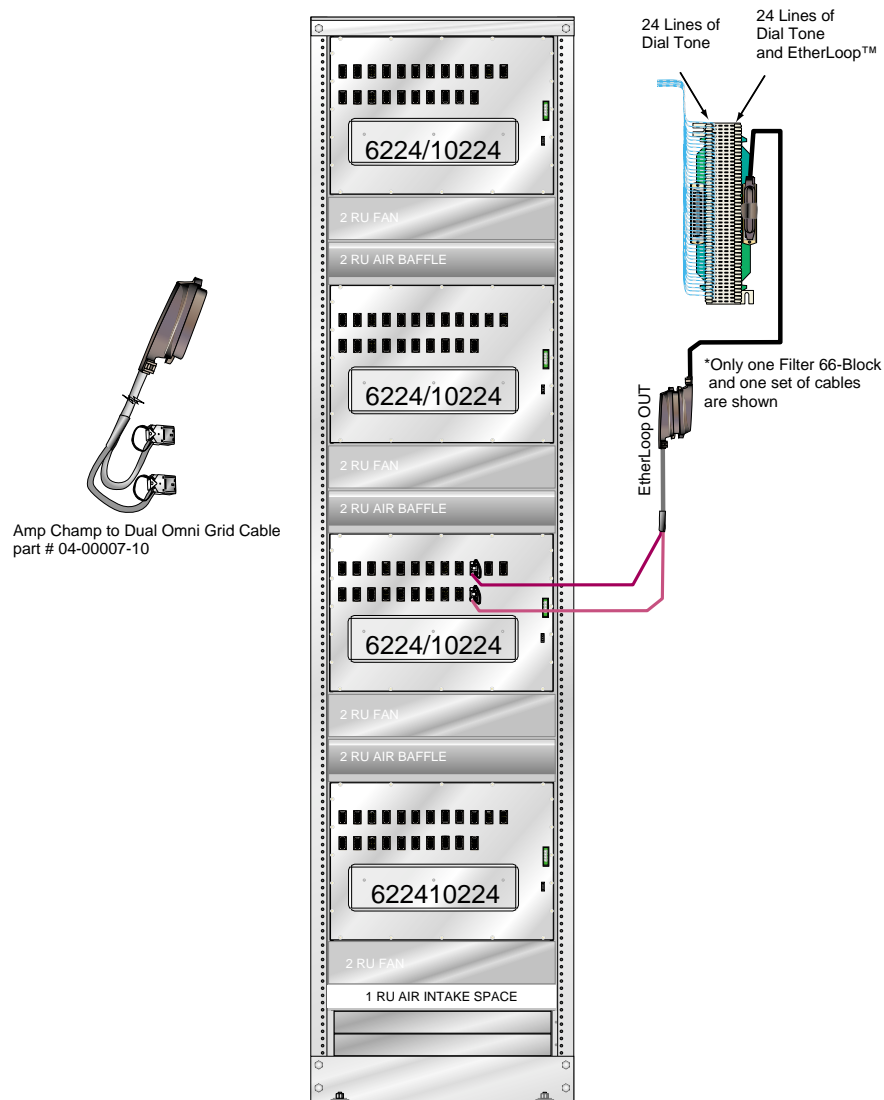


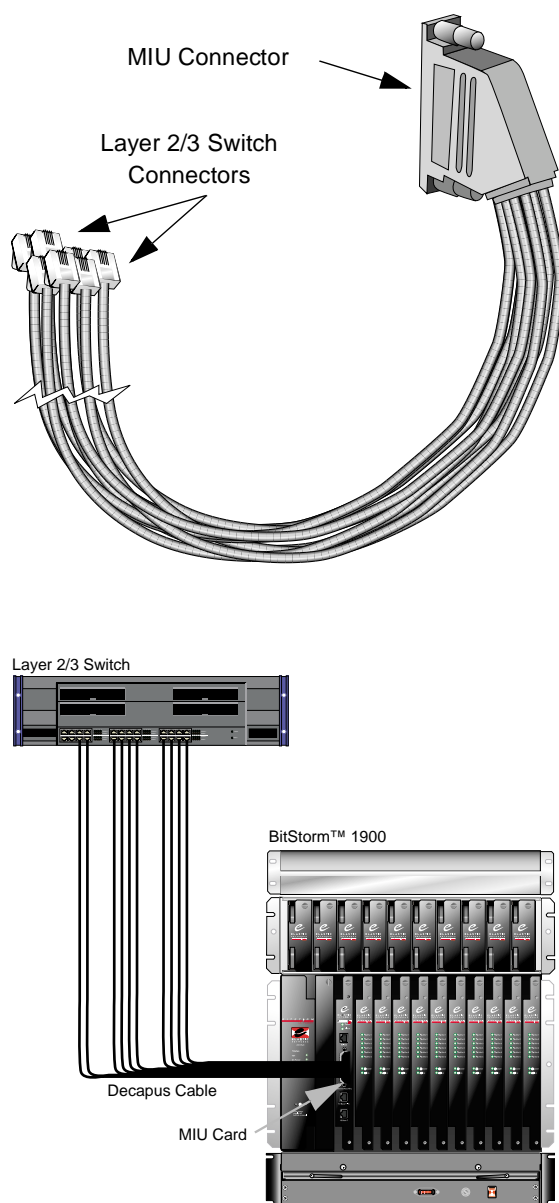
Figure B-6: Cabling - Filter 66-Block with 6224 or 10224 Modem Cards

BitStorm 1900 Cable Harness

Figure B-7 (shown below) illustrates the BitStorm 1900 cable assembly (DSUB50P to 10x RJ45). This cable connects the MIU card to the layer 2/3 switch.

Decapus Cable

Figure B-7: Decapus Cable Connections



AMP-Champ to Dual AMP Champ Cable

The AMP Champ to Dual AMP Champ cable connects from the Filter 66-Block to an AMP Champ Omni Grid cable, which connects to the 6306 or 10306 cards. Refer to *Figure B-8* (shown below) and to *Table B-1*, “AMP-Champ to Dual AMP-Champ Cable Specifications,” on page 152 for cable specifications.

Figure B-8: AMP Champ to Dual AMP Champ Cable (Part #: 04-00029-01)



Table B-1: AMP-Champ to Dual AMP-Champ Cable Specifications

Conn1	Color Code of Cable 1	Conn2
1	BL/W	1
26	W/BL	26
2	O/W	2
27	W/O	27
3	G/W	3
28	W/G	28
4	BR/W	4
29	W/BR	29
5	S/W	5
30	W/S	30
6	BL/R	6
31	R/BL	31
7	O/R	13
32	R/O	38
8	G/R	14
33	R/G	39
9	BR/R	15
34	R/BR	40
10	S/R	16
35	R/S	41
11	BL/BK	17
36	BK/BL	42
12	O/BK	18
37	BK/O	43

Conn1	Color Code of Cable 2	Conn3
13	G/BK	1
38	BK/G	26
14	BR/BK	2
39	BK/BR	27
15	S/BK	3
40	BK/S	28
16	BL/Y	4
41	Y/BL	29
17	O/Y	5
42	Y/O	30
18	G/Y	6
43	Y/G	31
19	BR/Y	13
44	Y/BR	38
20	S/Y	14
45	Y/S	39
21	BL/V	15
46	V/BL	40
22	O/V	16
47	V/O	41
23	G/V	17
48	V/G	42
24	BR/V	18
49	V/BR	43

AMP Champ to Dual Omni Grid Cable

The AMP Champ to Dual Omni Grid cable is used to connect the Filter Shelf or Filter 66-Block with 4212, 6306, 6224, 10306, and 10224 CO modem cards to the AMP Champ to AMP Champ cable the cross connect. For 6306, 6224, 10306, and 10224 CO modem cards connecting to a Filter 66-Block, this cable connects to the AMP Champ to Dual AMP Champ cable. Refer to *Figure B-9* (shown below) and *Table B-2*, “AMP Champ to Dual Omni Grid Cable Specifications,” on page 154 for cable specifications.

Figure B-9: AMP Champ to Dual Omni Grid Cable (Part # 04-00007-10)



Table B-2: AMP Champ to Dual Omni Grid Cable Specifications

From Conn	From Pin #	With Pair #	Color Code	To	To Pin #		From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	B2	R1	BLU/ WHT	P1	1		J1	A2	T1	WHT/ BLU		26
	E2	R2	OR/WHT		2			D2	T2	WHT/OR		27
	B3	R3	GR/WHT		3			A3	T3	WHT/GR		28
	E3	R4	BR/WHT		4			D3	T4	WHT/BR		29
	B4	R5	SLT/ WHT		5			A4	T5	WHT/ SLT		30
	E4	R6	BLU/ RED		6			D4	T6	RED/ BLU		31
	B6	R7	OR/RED		7			A6	T7	RED/OR		32
	E6	R8	GR/RED		8			D6	T8	RED/GR		33
	B7	R9	BR/RED		9			A7	T9	RED/BR		34
	E7	R10	SLT/ RED		10			D7	T10	RED/ SLT		35
	B8	R11	BLU/ BLK		11			A8	T11	BLK/ BLU		36
	E8	R12	OR/BLK		12		J2	D8	T12	BLK/OR	P1	37
J2	B2	R13	GR/BLK		13			A2	T13	BLK/GR		38
	E2	R14	BR/BLK		14			D2	T14	BLK/BR		39
	B3	R15	SLT/BLK		15			A3	T15	BLK/SLT		40
	E3	R16	BLU/ YEL		16			D3	T16	YEL/ BLU		41
	B4	R17	OR/YEL		17			A4	T17	YEL/OR		42
	E4	R18	GR/YEL		18			D4	T18	YEL/GR		43
	B6	R19	BR/YEL		19			A6	T19	YEL/BR		44
	E6	R20	SLT/YEL		20			D6	T20	YEL/SLT		45
	B7	R21	BLU/VIO		21			A7	T21	VIO/BLU		46
	E7	R22	OR/VIO		22			D7	T22	VIO/OR		47
	B8	R23	GR/VIO		23			A8	T23	VIO/GR		48
	E8	R24	BR/VIO		24			D8	T24	VIO/BR		49
	N/A		SLT/VIO		25			N/A		VIO/SLT		50

Omni Grid to Dual Omni Grid

The Omni Grid to Dual Omni Grid cable is used to connect the Filter Shelf to 6306 or 10306 CO modem cards. Refer to *Figure B-10* (shown below) and *Table B-3*, “Omni Grid to Dual Omni Grid Cable Specifications,” on page 156 for cable specifications.

Figure B-10: Omni Grid to Dual Omni Grid Cable (Part #: 04-00028-01)

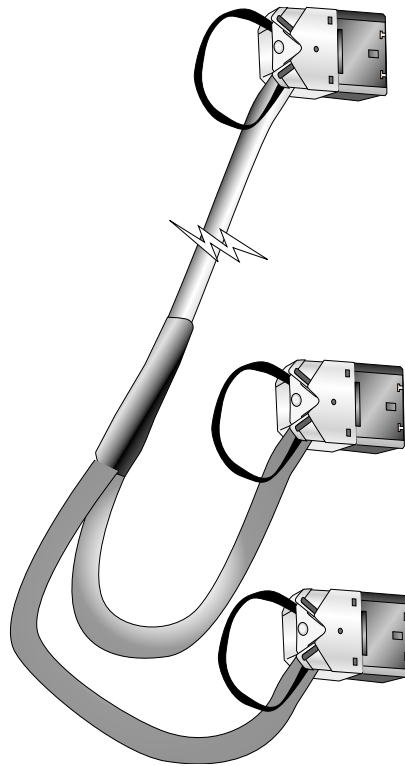


Table B-3: Omni Grid to Dual Omni Grid Cable Specifications

J3	J2	Color	J1
	B2	BLU/WHT	B2
	A2	WHT/BLU	A2
	E2	OR/WHT	E2
	D2	WHT/OR	D2
	B3	GR/WHT	B3
	A3	WHT/GR	A3
	E3	BR/WHT	E3
	D3	WHT/BR	D3
	B4	GRY/WHT	B4
	A4	WHT/GRY	A4
	E4	BLU/RED	E4
	D4	RED/BLU	D4
B2		OR/RED	B6
A2		RED/OR	A6
E2		GR/RED	E6
D2		RED/GR	D6
B3		BR/RED	B7
A3		RED/BR	A7
E3		GRY/RED	E7
D3		RED/GRY	D7
B4		BLU/BLK	B8
A4		BLK/BLU	A8
E4		OR/BLK	E8
D4		BLK/OR	D8

Omni Grid to Omni Grid Cable

The omni grid to omni grid cable connects the Filter Shelf to the 4212, 6224, and 10224 CO modem cards. Refer to *Figure B-11* (shown below) and *Table B-4*, “Omni Grid to Omni Grid Cable Specifications,” on page 158 for cable specifications.

Figure B-11: Omni Grid to Omni Grid Cable (Part #: 04-00008-18)

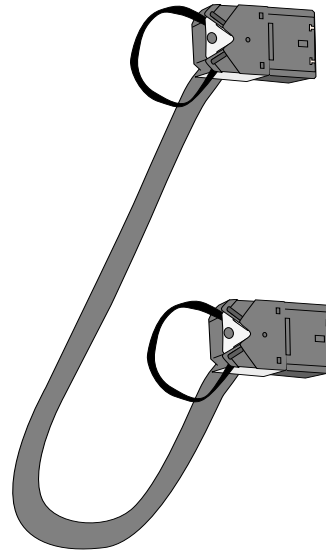


Table B-4: Omni Grid to Omni Grid Cable Specifications

From Conn	From Pin #	With Pair #	Color Code	To Conn	To Pin #		From Conn	From Pin #	With Pair #	Color Code	To Conn	To Pin #
J1	A2	T1	WHT/BLU	J2	A2	J1	J1	B2	R1	BLU/WHT	J2	B2
	D2	T2	WHT/OR		D2			E2	R2	OR/WHT		E2
	A3	T3	WHT/GR		A3			B3	R3	GR/WHT		B3
	D3	T4	WHT/BR		D3			E3	R4	BR/WHT		E3
	A4	T5	WHT/SLT		A4			B4	R5	SLT/WHT		B4
	D4	T6	RED/BLU		D4			E4	R6	BLU/RED		E4
	A6	T7	RED/OR		A6			B6	R7	OR/RED		B6
	D6	T8	RED/GR		D6			E6	R8	GR/RED		E6
	A7	T9	RED/BR		A7			B7	R9	BR/RED		B7
	D7	T10	RED/SLT		D7			E7	R10	SLT/RED		E7
	A8	T11	BLK/BLU		A8			B8	R11	BLU/BLK		B8
	D8	T12	BLK/OR		D8			E8	R12	OR/BLK		E8

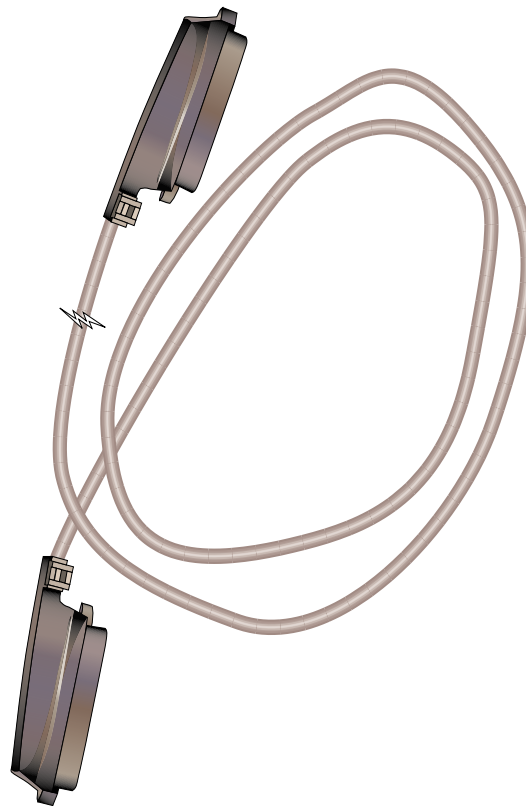
Intermediate Cable Specifications

BitStorm 1900 Access Multiplexer Intermediate (loop extension) cables can be obtained "off-the-shelf" from a variety of vendors, as long as cables chosen meet the following specifications:

- Category 5 bundled 25-pair cable made of 24-AWG wires
- Unshielded, 25-pair female connector (Amp-Champ or equivalent) on the end connecting to the BitStorm 1900 Access Multiplexer cable harness

Figure B-12 (shown below) illustrates an example of intermediate cabling suitable for use with the BitStorm 1900.

Figure B-12: Intermediate Cable

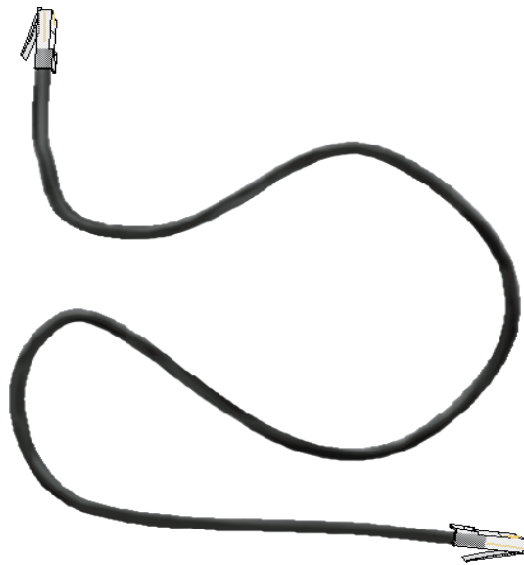


Category 5 Ethernet Cabling Specifications

The Switch card connects the BitStorm 1900 shelf to an Ethernet network over Category 5 (CAT 5) cabling with RJ-45 terminations.

Figure B-13 (shown below) illustrates the Ethernet CAT 5 cabling used with the BitStorm 1900.

Figure B-13: Ethernet CAT 5 Cable

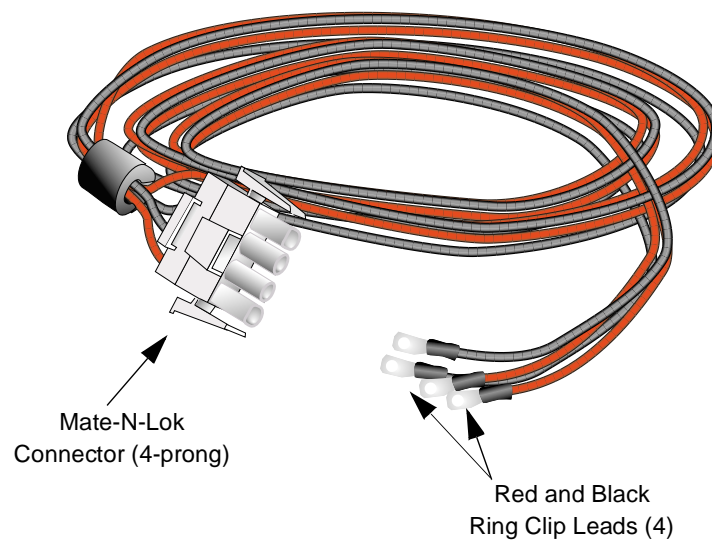


The Ethernet cable connecting to the BitStorm 1900 should be selected in the appropriate length that will avoid excess slack. Ethernet cables selected must conform to the Electronics Industry Association / Telecommunications Industry Association (EIA/TIA) 568-B Ethernet cabling standard.

Power Cable Harness

Figure B-14 (shown below) illustrates the BitStorm 1900 cable harness. The BitStorm 1900 power cable assembly connects the DC power source to the BitStorm Access Multiplexer shelf. One BitStorm 1900 power cable harness contains connectors to support three BitStorm Access 1900™ Multiplexer shelves.

Figure B-14: Power Cable Harness



Power Connector Terminations

The end of the BitStorm 1900 power cable assembly that connects to the power source has two red and two black leads. Each lead is terminated with 24-4 ring clips. If using a DC power supply, the BitStorm 1900 power cable assembly must terminate at the DC power source as shown in *Table B-5*. Refer to the WARNING label on the next page.

Table B-5: Terminal Connection for DC Power Source

Power Cable Connector	Power Source	Terminal Connection
Red (2)	DC supply	Negative (-)
Black (2)	DC return	Positive (+)



WARNING: POSSIBLE EQUIPMENT DAMAGE! Reversed polarities on the DC power feed can irreparably damage the BitStorm 1900 Access Multiplexer shelf components. Be certain power feeds are connected properly to the power source, with the red leads connected to the DC supply as shown in the table above. Note that this is the opposite of other (non-telecommunications) applications, in which red leads are usually connected to the "+" terminal.

Appendix C: SNMP MIBs

This chapter contains the SNMP Provisioning and MIBs information for the BitStorm 1900 MIU configuration. *The Craft Interface screens are also included in this chapter beginning on page 191.*

SNMP Provisioning

BitStorm 1900 Shelf and Modem Card Configuration via SNMP

Table C-1: System Group of MIB-II - RFC 1213

Feature	SNMP Input Variable	Description
Entering Contact Information	sysContact	Textual identification of the contact person for this managed device. In addition, contact information on how to reach this individual should be included.
Entering System Name	sysName	Administratively assigned name that describes the managed device.
Entering System Location	sysLocation	The physical location of the managed device.

Table C-2: System Interfaces of MIB-II - RFC 1213

Feature	SNMP Input Variable	Description
Configuring the state of the interface. (up, down, or testing)	IfAdminStatus	

Table C-3: BS1900 Shelf Interface Group

Feature	SNMP Input Variable	Description
Enabling Video Protect Mode on entire Shelf	ShelfVideoProtectMode	Setting this value to one (1) will turn video protect mode “on” for all EtherLoops on the shelf.
Enabling Traps to be forwarded to the Shelf	EnableShelfTraps	Setting this value to one (1) will enable all traps to be forwarded to the shelf.
Enabling Traps to be forwarded to the CO modem	EnableShelfTraps	Setting this value to one (1) will enable traps to be forwarded to the CO modem.
Enabling Traps to be forwarded to the CPE modem	EnableShelfTraps	Setting this value to one (1) will enable all traps to be forwarded to the CPE modem.

Table C-4: CO Modem Interface Group

Feature	SNMP Input Variable	Description
Setting the maximum number of broadcast messages.	COMdmIfMaxBroadcast	Setting this object defines the maximum number of broadcast messages per second that can be sent out the associated Ethernet port and all interfaces associated with this Ethernet Port.
Disabling and Enabling broadcast traffic	COMdmIfBlockBroadcast	Setting this object to “enabled” will allow the modem to forward all broadcast traffic out the port.
Setting maximum upstream throughput	COMdmIfMaxUpThruput	
Setting maximum downstream throughput	COMdmIfMaxDownThruput	
Enabling and disabling Video Protect mode – Setting the upstream symbol rate	COMdmIfMaxUpSymbolRate	
Enabling and disabling Video Protect mode – Setting the downstream symbol rate	COMdmIfMaxDownSymbolRate	
Setting the time in seconds after HDLC frames should be removed from the internal buffers	COMdmIfHDL-CiscThreshold	
Setting the modem to always run at the highest speed – setting Forced mode	COMdmIfForceHigh-Speed	

Feature	SNMP Input Variable	Description
Clearing the statistics of an interface.	COMdmIfClearStats	Setting the object to (2) will set all counters on the interface atn the assicoiated Ethernet port to 0. A trap is sent. Reading the object returns a value of (1).
Turning TRAPS ON/OFF	COMdmIfTrapStatus	Setting the object value to (1) turns on all traps on the CO modem. All traps will be sent. Setting the object value to (2) turns off all traps on the CO modem. No traps will be sent Setting the object value to (3) turns on all traps on the CO modem except for linkDown traps.

Supported SNMP MIBS

System Group and Interface Group of MIB-II

Table C-5: The System Group

The System Group			
Variable	Description	Accessibility	Implementation
sysDescr	A textual description of the entity. This value should include the full name and version identification of the system's hardware type, software Operating System and networking software. It is mandatory that this should only contain printable ASCII characters.	Read-only	The returns the concatenation of MIU hardware description string and firmware version string, such as "BitStorm MIU <Firmware rev>" The MIU software has the information.
sysObjectId	The vendor's authoritative identification of the network management subsystem contained in the entity. This value is allocated within the SMI enterprises subtree (1.3.6.1.4.1) and provides an easy and unambiguous means for determining 'what kind of box' is being managed.	Read-only	.1.3.6.1.4.1.3855.3.1 Defined as enSysObjectIDs Elastic Networks is assigned the subtree.1.3.6.1.4.1.3855
sysUpTime	The time (in hundredths of a second) since the network management portion of the system was last re-initialized.	Read-only	The uptime value for the MIU SNMP Agent.

The System Group			
Variable	Description	Accessibility	Implementation
sysContact	The textual identification of the contact person for this managed node, together with information on how to contact this person.	Read-write	Default value is "MIU Contact Name" that will be changed to an appropriate value by the Manager Application. Space provided is 63 bytes.
sysName	An administratively assigned name for this managed node. By convention, this is the node's fully qualified domain name.	Read-write	Default value is "MIU Contact Name" that will be changed to an appropriate value by the Manager Application. Space provided is 63 bytes.
sysLocation	The physical location of this node.	Read-write	Default value is "MIU Location" that will be changed to an appropriate value by the Manager Application. Space provided is 63 bytes.
sysServices	<p>A value that indicates the set of services that this entity primarily offers. The value is a sum. This sum initially takes the value zero. Then, for each layer, L, in the range 1 through 7, that this node performs transactions for, 2 raised to (L - 1) is added to the sum. For example, a node that performs primarily routing functions would have a value of 4 ($2^{(3-1)}$). In contrast, a node that is a host offering application services would have a value of 72 ($2^{(4-1)} + 2^{(7-1)}$).</p> <p>Note that in the context of the Internet suite of protocols, values should be calculated accordingly:</p> <p>Layer Functionality:</p> <p>Layer 1 - physical (e.g., repeaters)</p> <p>Layer 2 - datalink/subnetwork (e.g., bridges)</p> <p>Layer 3 - internet (e.g., IP gateways)</p> <p>Layer 4 - end-to-end (e.g., IP hosts)</p> <p>Layer 7 - applications (e.g., mail relays)</p> <p>* For systems including OSI protocols, Layers 5 and 6 may also be counted.</p>	Read-only	The 1900 MIU shelf will perform Layer 1 (physical) and Layer 2 functionality only. So the number would be $2^{(1-1)} + 2^{(2-1)} = 3$

The System Group			
Variable	Description	Accessibility	Implementation
sysServices	<p>A value that indicates the set of services that this entity primarily offers. The value is a sum. This sum initially takes the value zero. Then, for each layer, L, in the range 1 through 7, that this node performs transactions for, $2^{(L - 1)}$ is added to the sum. For example, a node that performs primarily routing functions would have a value of 4 ($2^{(3-1)}$). In contrast, a node that is a host offering application services would have a value of 72 ($2^{(4-1)} + 2^{(7-1)}$).</p> <p>Note that in the context of the Internet suite of protocols, values should be calculated accordingly:</p> <p>Layer Functionality:</p> <p>Layer 1 - physical (e.g., repeaters)</p> <p>Layer 2 - datalink/subnetwork (e.g., bridges)</p> <p>Layer 3 - internet (e.g., IP gateways)</p> <p>Layer 4 - end-to-end (e.g., IP hosts)</p> <p>Layer 7 - applications (e.g., mail relays)</p> <p>* For systems including OSI protocols, Layers 5 and 6 may also be counted.</p>	Read-only	The 1900 MIU shelf will perform Layer 1 (physical) and Layer 2 functionality only. So the number would be $2^{(1-1)} + 2^{(2-1)} = 3$

Table C-6: The Interface Group

The Interface Group			
Variable	Description	Accessibility	Implementation
IfNumber	The number of network interfaces (regardless of their current state) present on this system.	Read-only	<p>The total number of interface on the MIU shelf.</p> <p>The 1900 MIU shelf will have the Network Interfaces, such as:</p> <ul style="list-style-type: none"> • 2 x MIU ports • N x 100BaseT Ethernet ports (where N is the number of processors on the shelf) • n x EtherLoop lines on the CO modems
IfTable	A list of interface entries. The number of entries is given by the value of ifNumber.		
IfIndex	A unique value for each interface. Its value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the entity's network management system to the next re-initialization.	Read-only	This will range from 1 to the total number of interfaces on the MIU.
IfDescr	A textual string containing information about the interface. This string should include the name of the manufacturer, the product name and the version of the hardware interface.	Read-only	<p>The Interface description will be one of the following types:</p> <ul style="list-style-type: none"> • MIU ENET (X) Port • BitStorm xxx Server, slot n, unit m, ENET Port y • BitStorm xxx Server, slot n, unit m, HDLC Port x
IfType	The type of interface, distinguished according to the physical/link protocol(s) immediately 'below' the network layer in the protocol stack. Please see RFC1213 for an enumeration of the possible values.	Read-only	<p>The interface type does comply with any of the standard enumerated types.</p> <p>Type is 'Other' {1}.</p>

The Interface Group			
Variable	Description	Accessibility	Implementation
IfMtu	The size of the largest datagram that can be sent/received on the interface, specified in octets. For interfaces that are used for transmitting network datagrams, this is the size of the largest network datagram that can be sent on the interface.	Read-only	The largest size of Ethernet frame, 1518 bytes. The largest size of HDLC frame, for EtherLoop interface is 1522 bytes.
IfSpeed	An estimate of the interface's current bandwidth in bits per second. For interfaces that do not vary in bandwidth or for those where no accurate estimation can be made, this object should contain the nominal bandwidth.	Read-only	The bandwidth for the Ethernet interface would be 10/100 Mbps For the EtherLoop interface, the current bandwidth can be determined from the modulation and symbolrate for the maximum trained speed. The extents <i>GetPortInfo(GeneralOp)</i> and <i>GetModemSpeedInfo(SpeedOp)</i> can be used to determine the bandwidth.
IfPhysAddress	The interface's address at the protocol layer immediately 'below' the network layer in the protocol stack. For interfaces that do not have such an address (e.g., a serial line), this object should contain an octet string of zero length.	Read-only	For EtherLoop and Ethernet Interfaces on the Line cards, it is the MAC address of the CO modem. The CO MAC addresses can be retrieved by a broadcast extent <i>RWMacAddr(MemoryOp)</i> . For the MIU port, it is the MAC address of the MIU.
IfAdminStatus	The desired state of the interface. The testing(3) state indicates that no operational packets can be passed. <ul style="list-style-type: none"> • up(1) -- ready to pass packets • down(2) • testing(3) -- in some test mode 	Read-write	The desired status is up (1) by default. It is a settable attribute and so can be changed on Manager request. The EtherLoop interface status may be changed (enable/disable) by the extent <i>EnablePort(MultiportOp)</i> . There is no implementation for changing the Ethernet interface status (enable/disable). The status testing (3) is not applicable.

The Interface Group			
Variable	Description	Accessibility	Implementation
IfOperStatus	<p>The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed.</p> <ul style="list-style-type: none"> • up(1) -- ready to pass packets • down(2) • testing(3) -- in some test mode 	Read-only	<p>The EtherLoop interface status is the <i>PortEnabled</i> value as returned by the extent <i>GetPortInfo (GeneralOp)</i>.</p> <p>The Ethernet interface status is the <i>EnetLinkStatus</i> value as returned by the extent <i>GetModemInfo (GeneralOp)</i>.</p> <p>The status testing (3) is not applicable.</p>
IfLastChange	The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last re-initialization of the local network management subsystem, then this object contains a zero value.	Read-only	Initially 0 for all interfaces. If an interface changes its state, it will indicate the time for which the interface has been in that state.
IfInOctets	The total number of octets received on the interface, including framing characters.	Read-only	<p>For the EtherLoop interface, it is the value of <i>receive_bytes (HDLC RxBytes)</i> as returned by the extent <i>GetPortInfo (GeneralOp)</i>.</p> <p>For the Ethernet interface, it is the value of <i>receive_byte_count (EnetRxByteCount)</i> as returned by the extent <i>GetModemInfo (GeneralOp)</i>.</p>
IfInUcastPkts	The number of subnetwork-unicast packets delivered to a higher-layer protocol.	Read-only	Not applicable.
IfInNUcastPkts	The number of non-unicast (i.e., subnetwork-broadcast or subnetwork-multicast) packets delivered to a higher-layer protocol.	Read-only	Not applicable.
IfInDiscards	The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.	Read-only	<p>For the EtherLoop interface, it is the value of <i>discard_frames (HDLC Discard-Frames)</i> as returned by the extent <i>GetPortInfo (GeneralOp)</i>.</p> <p>Not implemented for the Ethernet interface.</p>

The Interface Group			
Variable	Description	Accessibility	Implementation
IfInErrors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.	Read-only	For the EtherLoop interface, it is the value of <i>received_retries</i> (HDLCRxRetries) as returned by the extent <i>GetPortInfo(GeneralOp)</i> . For the Ethernet interface, it is the value of <i>receive_errors</i> (<i>EnetRxErrors</i>) as returned by the extent <i>GetModemInfo(GeneralOp)</i> .
IfInUnknownProtos	The number of packets received via the interface that were discarded because of an unknown or unsupported protocol.	Read-only	Not applicable.
IfOutOctets	The total number of octets transmitted out of the interface, including framing characters.	Read-only	For the Ethernet interface it is the value of <i>Enet_Userbytes</i> returned by the extent <i>GetModemInfo(GeneralOp)</i> . For the EtherLoop interface no extent is implemented that can be applied to the CO modem port. However, it is the same as <i>Enet_Userbytes</i> returned by the extent <i>GetModemInfo(GeneralOp)</i> when applied to the CPE modem connected at the EtherLoop port.
IfOutUcastPkts	The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.	Read-only	Not applicable.
IfOutNUcastPkts	The total number of packets that higher-level protocols requested be transmitted to a non-unicast (i.e., a subnetwork-broadcast or subnetwork-multicast) address, including those that were discarded or not sent.	Read-only	Not applicable.

The Interface Group			
Variable	Description	Accessibility	Implementation
IfOutDiscards	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.	Read-only	Not implemented.
IfOutErrors	The number of outbound packets that could not be transmitted because of errors.	Read-only	For the EtherLoop interface, it is the value of <i>transmit_retries</i> (HDLCTxRetries) as returned by the extent <i>GetPortInfo(GeneralOp)</i> . For the Ethernet interface, it is the value of <i>transmit_errors</i> (EnetTxErrors) as returned by the extent <i>GetModemInfo(GeneralOp)</i> .
IfOutQLen	The length of the output packet queue (in packets).	Read-only	Not implemented.
IfSpecific	A reference to MIB definitions specific to the particular media being used to realize the interface. For example, if the interface is realized by an Ethernet, then the value of this object refers to a document defining objects specific to Ethernet. If this information is not present, its value should be set to the OBJECT IDENTIFIER { 0 0 }, which is a syntactically valid object identifier, and any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.	Read-only	Not Implemented.

EtherLoop Modem MIB

All the object names defined in this MIB start with 'enEloop'. In order to save space in the Variable column, and give more space to the Description column, the prefix 'enEloop' is stripped off.

Table C-7: The EnEloopShelf Group

The EnEloopShelf Group			
Variable	Description	Accessibility	Implementation
ShelfStatus	<p>The operational status of the shelf.</p> <ul style="list-style-type: none"> • green(1) indicates normal operation. • yellow(2) indicates at least one minor alarm is present. • red(3) indicates at that at least one major alarm is resent. This value corresponds to the status LED on the front of this shelf. 	read-only	Not implemented in Release
ShelfCurrentAlarms	<p>A bitmask of all current alarm conditions. The value is a sum. For a shelf with no alarms, the value is zero. For each alarm condition, the value of that alarm is added to this value. The values are:</p> <ul style="list-style-type: none"> • downAlarm (1) - MIU has detected that the shelf is not responding. • tempAlarm (2) - The shelf has detected a temperature higher than specifications allow. • ps1Alarm (4) - The shelf has detected that the voltage of power supply #1 is not within tolerance. • ps2Alarm (8) - The shelf has detected that the voltage of power supply #1 is not within tolerance. • psAlarm (16) - The shelf has detected that the voltage of power supply #1 is not within tolerance. 	read-only	Not implemented in Release 1.
ShelfTemp	The current temperature of the shelf in degrees C	read-only	Not implemented in Release 1.

The EnEloopShelf Group			
Variable	Description	Accessibility	Implementation
ShelfVideoProtectMode	If this value is on (1), Video Protect Mode is on for all Etherloops on this shelf	read-write	This would be obtained from or written to the MIU flash memory. On changing the value, <i>RWSymbolRateLimit</i> extent would be sent to all BS6306 modems.
EnableShelfTraps	If a trap destination is configured and this value is on (1), traps are sent for this shelf	read-write	This would be obtained from or written to the MIU flash memory.
EnableCOModemIfTraps	If a trap destination is configured and this value is on (1), traps are sent for CO modem interfaces	read-write	This would be obtained from or written to the MIU flash memory.
EnableCPEModemTraps	If a trap destination is configured and this value is on (1), traps are sent for CPE modem	read-write	This would be obtained from or written to the MIU flash memory.

The EnEloop CO Modem Interface Group

Table C-8: The CO Modem Interface Statistics Table

The CO Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
COMdmlfStatsIfIndex	The index for each CO modem Etherloop interface. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CO modem Etherloop interface	read-only	This maps to the <i>IfIndex</i> of the <i>IfTable</i> .
COMdmlfCurrentTxSpeed	The speed level at which the CO modem is transmitting on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmlfCurrentRxSpeed	The speed level at which the CO modem is receiving on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmlfUpTime	The time, in tenths of a second, that the CO modem for this interface has been up	read-only	This would be obtained from the extent <i>GetModemInfo/SysUpTime (GeneralOp)</i> .
COMdmlfTheoreticalTxSpeed	The theoretical speed, in bits per second, at which the CO modem can transmit on this interface	read-only	This theoretical speed can be calculated based on the <i>TxSpeed</i> level (as mentioned above) and the modulations supported by the modem.
COMdmlfTheoreticalRxSpeed	The theoretical speed, in bits per second, at which the CO modem can receive on this interface	read-only	This theoretical speed can be calculated based on the <i>RxSpeed</i> level (as mentioned above) and the modulations supported by the modem.
COMdmlfMaxTxTrndSpeed	The maximum transmit speed level at which the CO modem has trained on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmlfMaxRxTrndSpeed	The maximum receive speed level at which the CO modem has trained on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .

The CO Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
COMdmIfLocalLQF	The locally measured Line Quality Factor of the Etherloop line	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .
COMdmIfRemoteLQF	The Line Quality Factor of the HDLC link as measured by the remote CPE modem	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .
COMdmIfFreeBufferCount	The current count of free buffers for this CO modem interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
COMdmIfApparentDistance	The apparent distance, in 1000 ft units, detected on the Etherloop	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .

Table C-9: The CO Modem Interface Configuration Table

The CO Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
COMdmIfConfigIfIndex	The index for each CO modem EtherLoop. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CO modem EtherLoop	read-only	This maps to the <i>IfIndex</i> of the IfTable.
COMdmIfFirmwareRev	The firmware revision for this CO modem interface	read-only	This is obtained from the extent <i>Capabilities (GeneralOp)</i> . However, this would be obtained only at the Initialization time and saved as static data in the memory.
COMdmIfCurModulation	The modulation currently in use on this interface	read-only	This is obtained from the extent <i>Capabilities (GeneralOp)</i> . However, this would be obtained only at the Initialization time and saved as static data in the memory.
COMdmIfSpeedCount	The number of speeds supported by CO modem interface. This is also the number of entries in the enEloopCOMdmIf-SpeedTable	read-only	This is obtained from the extent <i>GetModemInfo (GeneralOp)</i> . It is obtained only at the Initialization time and saved as static data in the memory.
COMdmIfBlockBroadcast	If Broadcasts are enabled, the modem will pass them out the port	read-write	This would be obtained/changed by the extent <i>ProvisionModem (GeneralOp)</i> .

The CO Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
COMdmIfRecurTrngDelay	The interval, in seconds, between training bursts. The default is 4 for 6224/12:1 and 1 for all other modems	read-only	This would be obtained from the extent <i>ProvisionModem</i> (GeneralOp).
COMdmIfForceHighSpeed	If this object is Enabled, then this modem interface will always run at maximum speed	read-write	This would be obtained/changed by the extent <i>ProvisionModem</i> (GeneralOp).
COMdmIfModemRev	The modem hardware revision number	read-only	This would be obtained from the extent <i>Capabilities</i> (GeneralOp).
COMdmIfModemBTEQRev	The modem hardware BTEQ revision number	read-only	This would be obtained from the extent <i>Capabilities</i> (GeneralOp).
COMdmIfClearStats	If clear(2) is written to this object, the counters on this interface and the associated Ethernet port are set to 0 and a ??? trap is sent. Reading this object always returns a value of normal(1)	read-write	Setting this variable would send out the extent <i>ClearStatistics</i> (GeneralOp).
COMdmIfTrapStatus	If the value of this object is trapsOn(1), then all traps for this CO modem interface will be sent. If the value of this object is trapsOff(2), then no traps for this CO modem interface will be sent.	read-write	This would be read from or written to the MIU's flash memory.

The CO Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
enEloopCOMdmIfReset	If resetPort (2) is writtren to the object, it forces the port to reset and begin pwer-on training. If reset-Modem (3) is written to the object, it forces the modem corresponding to the port to perform a cold restart. A read of the variable, if exists will always return normal (1).	read-write	<p>The read operation returns 1 if the interface is active.</p> <p>The write operation of:</p> <p>1 will do nothing</p> <p>2 will cause a ResetPort extent to be sent to the corresponding port, and a COModemIfReset-PortEvent trap be sent to the defined trap destinations.</p> <p>3 will cause a ResetMo-dem extent be sent to the corresponding modem, and a COModemIfRe-setEvent trap be sent to the defined trap destinations.</p>

Table C-10: The CO Modem Speed Table

The CO ModemSpeed Table			
Variable	Description	Accessibility	Implementation
COMdmIfSpeedIfIndex	<p>The primary index of this table.</p> <p>This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CO modem Etherloop interface</p>	read-only	This maps to the <i>IfIndex</i> of the IfTable corresponding to the Ether-Loop/Etherloop port.

The CO ModemSpeed Table			
Variable	Description	Accessibility	Implementation
COMdmIfSpeed	The speed level for this table entry. This is the secondary index of this table.	read-only	This is the speed level that will range from 0 to the max speed value. The max number of speeds is already discussed in the CoModem-ConfigTable, this is obtained at the initialization time.
COMdmIfRxGain	Receiver Gain	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfTxAtten	Transmitter Attenuation	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfPreamp		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfRxTrainingCount	Receiver	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfTxTrainingCount	Transmitter	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfRxRetrains	Receiver Retrain #	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfTxRetrains	Transmitter Retrain #	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfRemoteTxAtten	CPE Transmitter Attenuation	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
COMdmIfSymbolRate	The symbol rate used at this speed level on this port	read-only	This would be obtained from the extent <i>GetModemSpeedInfo (SpeedOp)</i> . Note: This may be changed to get the symbol rate from a static table.

The CO ModemSpeed Table			
Variable	Description	Accessibility	Implementation
COMdmIfModulation	The modulation scheme used at this speed level on this port	read-only	This would be obtained from the extent <i>GetModemSpeedInfo</i> (<i>SpeedOp</i>). Note: This may be changed to get the modulation from a static table.

Table C-11: The CO Modem Spectrum Manager Table

The CO Modem Spectrum Manager Table			
Variable	Description	Accessibility	Implementation
COMdmIfSpecMgrIfIndex	The index for each CO modem EtherLoop. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CO modem EtherLoop	read-only	This would map to the ifIndex of the ifTable.
COMdmIfSpecMgrLogInOps	If this object is set to on(1), then logging of the Spectrum Manager internal operations will be done	read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>)
COMdmIfSpecMgrMode		read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>)
COMdmIfSpecMgrAction	Action taken most recently	read-only	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>)
COMdmIfSpecMgrInterval	Wake up interval, in seconds, for detection	read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>)

The CO Modem Spectrum Manager Table			
Variable	Description	Accessibility	Implementation
COMdmIfSpecMgrDetectSvc	Service detected most recently	read-only	This would be obtained from the extent <i>SpectrumManagerState (SpectrumMgrOp)</i>
COMdmIfSpecMgrCompMode	The equipment with which this modem can co-exist on the Etherloop	read-write	Not implemented as of now – defined for future use.
COMdmIfSpecMgrTrngMode	The initial training speed pair for this interface	read-write	Not implemented as of now – defined for future use.

The Enloop CPE Modem Group

Table C-12: The CPE Modem Interface Statistics Table

The CPE Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
CPEMdmStatsIfIndex	The index for each CPE modem. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CPE modem Etherloop interface to which this CPE modem is attached. It has the same value as the corresponding indices of other tables in this MIB	read-only	This would map to the <i>IfIndex</i> of the IfTable.
CPEMdmUpTime	The time, in tenths of a second, that the CPE modem has been up	read-only	This would be obtained from the extent <i>GetModemInfo/SysUpTime (GeneralOp)</i> .
CPEMdmCurrentTxSpeed	The speed level at which the CPE modem is transmitting on this interface	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .

The CPE Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
CPEMdmCurrentRxSpeed	The speed level at which the CPE modem is receiving on this interface	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .
CPEMdmTheoreticalTxSpeed	The theoretical speed, in bits per second, at which the CPE modem can transmit on this interface	read-only	This theoretical speed can be calculated based on the Tx Speed level and the modulations supported by the modem.
CPEMdmTheoreticalRxSpeed	The theoretical speed, in bits per second, at which the CPE modem can receive on this interface	read-only	This theoretical speed can be calculated based on the Rx Speed level and the modulations supported by the modem.
CPEMdmEnetTxBytes	The count of bytes transmitted by this modem on the Ethernet interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmEnetRxBytes	The count of bytes received by this modem on the Ethernet interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmEnetTxFrames	The count of frames transmitted by this modem on the Ethernet interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmEnetRxFrames	The count of frames received by this modem on the Ethernet interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmEnetTxErrors	The count of frames that could not be transmitted by this modem on the Ethernet interface due to errors	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmEnetRxErrors	The count of frames received by this modem on the Ethernet interface that were discarded due to errors	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmHDLCTxBytes	The count of bytes transmitted by this modem on the Etherloop interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .

The CPE Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
CPEMdmHDLCRxBytes	The count of bytes received by this modem on the Etherloop interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC TxBlocks	The count of blocks transmitted by this modem on the Etherloop interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC RxFrames	The count of frames received by this modem on the Etherloop interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC RxBlocks	The count of HDLC blocks received by this modem on the Etherloop interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC TxErrors	The count of frames that could not be transmitted by this modem on the Ethernet interface due to errors	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC RxErrors	The count of frames received by this modem on the Etherloop interface that were discarded due to errors	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmHDLC Retries	The count of Etherloop receive bursts that had to be resent by the remote end	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmMaxTxTrndSpeed	The maximum transmit speed level at which the CPE modem has trained on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmMaxRxTrndSpeed	The maximum receive speed level at which the CPE modem has trained on this interface	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmLocalLQF	The locally measured Line Quality Factor of the HDLC link	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .

The CPE Modem Interface Statistics Table			
Variable	Description	Accessibility	Implementation
CPEMdmRemoteLQF	The Line Quality Factor of the HDLC link as measured by the remote CPE modem	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .
CPEMdmFreeBufferCount	The current count of free buffers for this CPE modem interface	read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> .
CPEMdmApparentDistance	The apparent distance, in 1000 ft units, detected on the Etherloop	read-only	This would be obtained from the extent <i>GetPortInfo (GeneralOp)</i> .

Table C-13: The CPE Modem Interface Configuration Table

The CPE Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
CPEMdmConfigIfIndex	The index for each CPE modem Etherloop interface. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CPE modem Etherloop interface	Read-only	This maps to the IfIndex of the IfTable.
CPEMdmDescr	A printable text string describing this modem, in the format <hardware>	Read-only	This would be obtained from the extent <i>Capabilities (GeneralOp)</i> . This would be obtained only at initialization time and saved in the memory.
CPEMdmEnetIfStatus	The current status of the Ethernet interface on this modem. Setting this object to down(2) causes the Ethernet interface to stop communicating	Read-write	This would be obtained/changed by the extent <i>GetPortInfo/GetStatus (GeneralOp)</i> . (CPEEnetEnabled)
CPEMdmMACAddress	The six byte MAC address of the Ethernet interface of this CPE modem	Read-only	This would be obtained at initialization time and saved in memory.

The CPE Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
CPEMdmFirmwareRev	The firmware revision for this CPE modem interface	Read-only	This would be obtained from the extent <i>Capabilities (GeneralOp)</i> . This would be obtained only at initialization time and saved in the memory.
CPEMdmCurModulation	The modulation scheme currently in use on this interface	Read-only	This would be obtained from the extent <i>Capabilities (GeneralOp)</i> . This would be however obtained only at initialization time and saved in the memory.
CPEMdmSpeedCount	The number of speeds supported by CPE modem interface. This is also the number of entries in the enEloopCPEMdm-SpeedTable	Read-only	This would be obtained from the extent <i>GetModemInfo (GeneralOp)</i> . This would be however obtained only at initialization time and saved in the memory.
CPEMdmModemRev	The modem hardware revision number	read-only	This would be obtained from the extent <i>Capabilities (GeneralOp)</i> . This would be obtained only at initialization time and saved in the memory.
CPEMdmModemBTE-QRev	The modem hardware BTEQ revision number	read-only	This would be obtained from the extent <i>Capabilities (GeneralOp)</i> . This would be obtained only at initialization time and saved in the memory.
CPEMdmReset	If reset(2) is written to this object, this modem is re-booted. A read of this variable, if it exists, always return normal(1).	Read-write	Setting this value to reset (2) will cause the extent <i>Reset-Modem (GeneralOp)</i> to be sent.
CPEMdmClearStats	If clear(2) is written to this object, the counters on this interface and the associated Ethernet port are set to 0 and a ??? trap is sent. Reading this object always returns a value of normal(1)	Read-write	Setting this value to clear (2) will cause the extent <i>ClearStatistics (GeneralOp)</i> to be sent.

The CPE Modem Interface Configuration Table			
Variable	Description	Accessibility	Implementation
CPEMdmTrapStatus	<p>If the value of this object is trap-sOn(1), then all traps for this CPE modem interface will be sent.</p> <p>If the value of this object is trap-sOff(2), then no traps for this CPE modem interface will be sent.</p>	Read-write	This would be written to or obtained from the MIU's flash memory.

Table C-14: The CPE Modem Speed Table

The CPE Modem Speed Table			
Variable	Description	Accessibility	Implementation
CPEMdmSpeedIfIndex	The index for each CPE modem. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CPE modem	read-only	This maps to the ifIndex of the IfTable.
CPEMdmSpeed	<p>The speed level for this table entry.</p> <p>This object is the secondary index of the table.</p>	read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmRxGain		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmTxAtten		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmPreamp		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmRxCount		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .

The CPE Modem Speed Table			
Variable	Description	Accessibility	Implementation
CPEMdmTxCount		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmRxRetrains		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmTxRetrains		read-only	This would be obtained from the extent <i>GetPort-Info (GeneralOp)</i> .
CPEMdmRemoteTxAtten		read-only	This would be obtained from the extent <i>GetPort-Info</i>
CPEMdmSymbolRate	The symbol rate used at this speed level on this port	read-only	This would be obtained from the extent <i>GetModemSpeedInfo (SpeedOp)</i> .
CPEMdmModulation	The modulation scheme used at this speed level on this port	read-only	This would be obtained from the extent <i>GetModemSpeedInfo (SpeedOp)</i> .

Table C-15: The CPE Modem Spectrum Manager Table

The CPE Modem Spectrum Manager Table			
Variable	Description	Accessibility	Implementation
CPEMdmSpecMgrIfIndex	The index for each CPE modem Etherloop interface. This object corresponds to MIB-II ifIndex. It has the same value as the corresponding indices of other tables and uniquely identifies each CPE modem Etherloop interface	read-only	This would map to the ifindex of the IfTable.

The CPE Modem Spectrum Manager Table			
Variable	Description	Accessibility	Implementation
CPEMdmSpecMgrLogInOps	If this object is set to on(1), then logging of the Spectrum Manager internal operations will be done	read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>).
CPEMdmSpecMgrMode		read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>).
CPEMdmSpecMgrAction	Action taken most recently	read-only	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>).
CPEMdmSpecMgrInterval	Wake up interval, in seconds, for detection	read-write	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>).
CPEMdmSpecMgrDetectSvc	Service detected most recently	read-only	This would be obtained/changed by the extent <i>SpectrumManagerState</i> (<i>SpectrumMgrOp</i>).
CPEMdmSpecMgrComp-Mode	The equipment with which this modem can co-exist on the Etherloop	read-write	Not implemented now – for future use.
CPEMdmSpecMgrTrng-Mode	The initial training speed pair for this interface	read-write	Not implemented now – for future use.

The EnEloopTraps Group

Table C-16: The EnEloop Traps Group

The EnEloop Traps Group			
Variable	Description	Accessibility	Implementation
COModemIfDownEvent	The CO modem for this interface is down and/or not communicating with the MIU	IfIndex	Detected in poll logic.

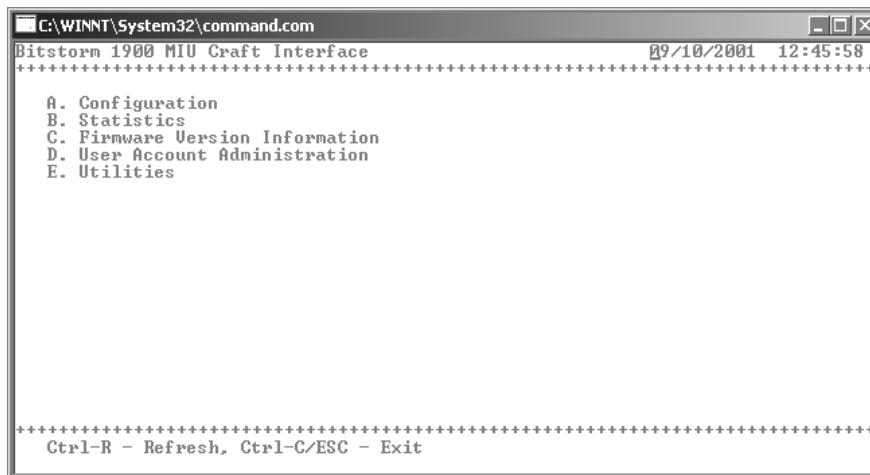
The EnEloop Traps Group			
Variable	Description	Accessibility	Implementation
COModemIfUpEvent	The CO modem for this interface is up and now communicating with the MIU	IfIndex	Detected in poll logic.
CPEModemEnetDown-Event	The CPE modem Ethernet interface is down, either because there is no attached device, or because enEloopCPEModemEnetIfStatus was set to down(2).	IfIndex	Not implemented in Release 1.
CPEModemEnetUpEvent	The CPE modem Ethernet interface is up, and there is an attached device	IfIndex	Not implemented in Release 1.
sCOModemIfClearStatsEvent	A request to set enEloopCOModemIfClearStats to clear(2) has been received	IfIndex	Send from the method routine that clears CO statistics.
CPEModemClearStatsEvent	A request to set enEloopCPEModemClearStats to clear(2) has been received	IfIndex	Send from the method routine that clears CPE statistics.
CPEModemResetEvent	A request to set enEloopCPEModemReset to reset(2) has been received	IfIndex	Send from the method routine that clears CPE statistics.
ShelfStatusChange	A change in the shelf status has been detected. This corresponds with a change in the enEloopShelfStatus variable and a change of the color of the status LED on the front of the shelf.	ShelfStatus	Not implemented in Release 1.

Craft Interface Screens

This sections includes all of the Craft Interface screens available from the Main Menu.

Main Menu

Figure C-1: Main Menu



Configuration

Figure C-2: (A. Configuration) Configuration Menu

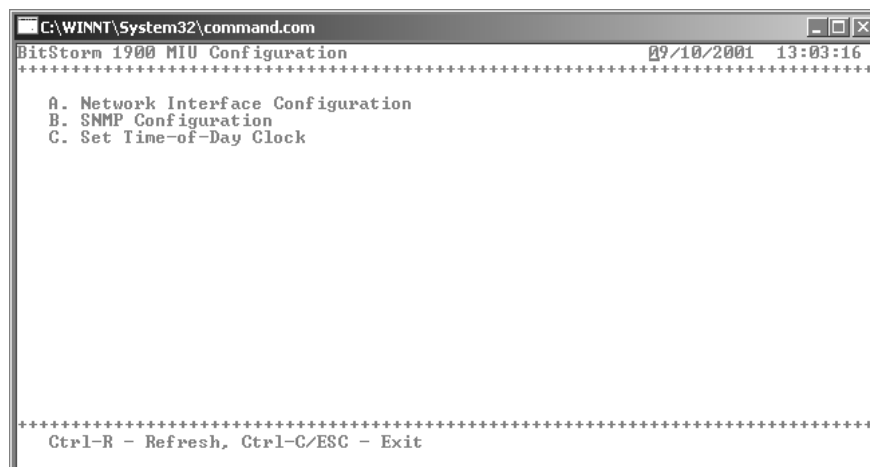


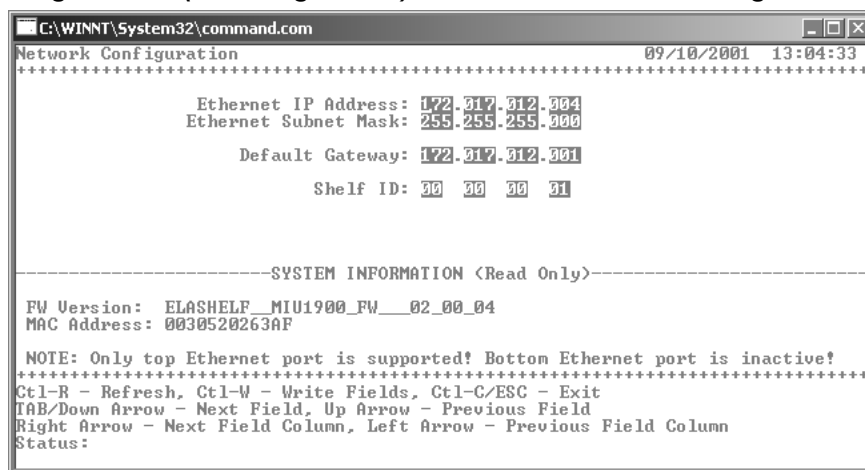
Figure C-3: (A. Configuration) A. Network Interface Configuration**Figure C-4: (A. Configuration) B. SNMP Configuration Menu**

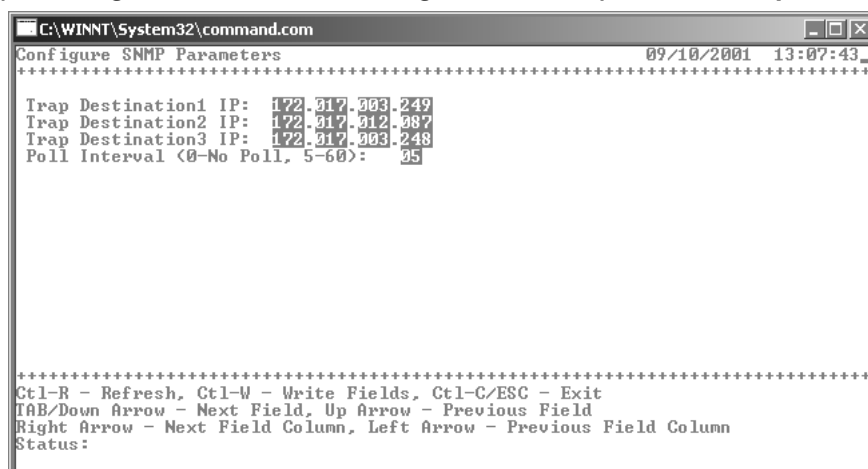
Figure C-5: (A. Configuration, B. SNMP Configuration Menu) A. SNMP Trap/Polling Parameters**Figure C-6: (A. Configuration, B. SNMP Configuration Menu) B. Change SNMP Community Names**

Figure C-7: (A. Configuration) C. Set Time-of-Day Clock

Statistics

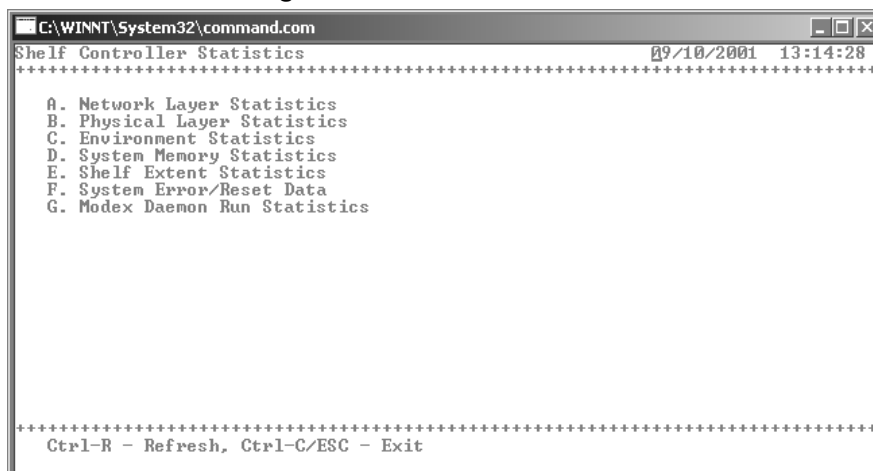
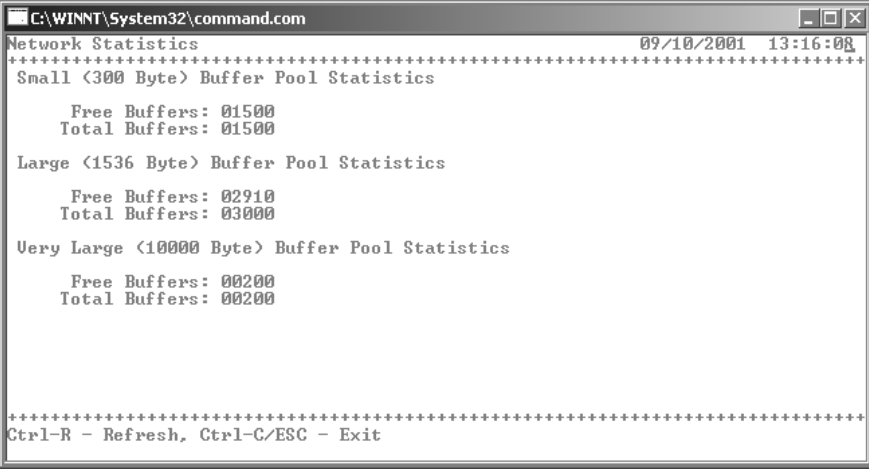
Figure C-8: B. Statistics Menu

Figure C-9: (B. Statistics) A. Network Layer Statistics


```

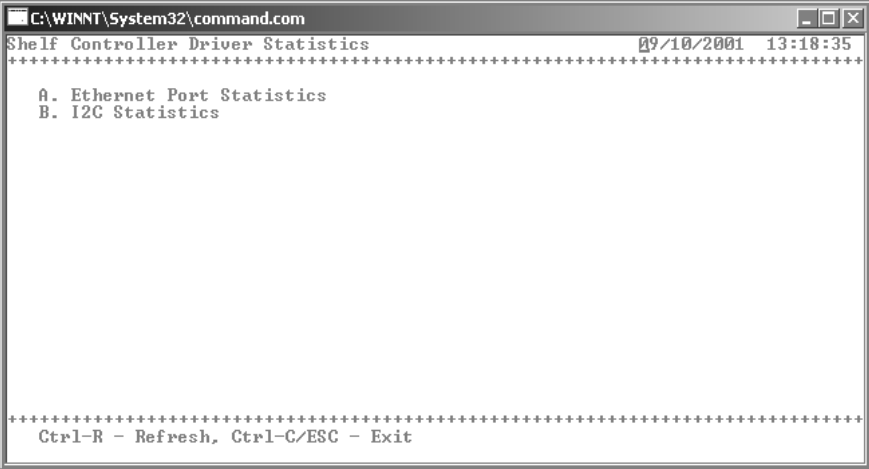
C:\WINNT\System32\command.com
Network Statistics                                09/10/2001 13:16:08
*****
Small (300 Byte) Buffer Pool Statistics
    Free Buffers: 01500
    Total Buffers: 01500

Large (1536 Byte) Buffer Pool Statistics
    Free Buffers: 02910
    Total Buffers: 03000

Very Large (10000 Byte) Buffer Pool Statistics
    Free Buffers: 00200
    Total Buffers: 00200

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

Figure C-10: (B. Statistics) B. Physical Layer Statistics Menu


```

C:\WINNT\System32\command.com
Shelf Controller Driver Statistics                09/10/2001 13:18:35
*****

A. Ethernet Port Statistics
B. I2C Statistics

*****

Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

Figure C-11: (B. Statistics, B. Physical Layer Statistics) A. Ethernet Port Statistics

```

C:\WINNT\System32\command.com
Ethernet Port 2 Statistics                                09/10/2001 13:19:49
*****
CRC Errors: [1;60f09/10/2001 13:19:48size Frames: 0000000000
Oversize Frames: 0000000000           Aborted Frames: 0000000000
Alignment Errors: 0000000000           Received Bytes: 0148888844
Transmitted Bytes: 0002228229           Receive Overruns: 0000000000
Received Frames: 0001218506           Transmitted Frames: 0000023708
Rx Frames/Sec: 0000000005             Tx Frames/Sec: 0000000000
Error Code: 00000000                 Tx Errors: 0000000000

Packet Header Pool Free: 0000000110 / 0000000200
Shelf TX Msg Header Pool Free: 0000000200 / 0000000200
Stack TX Msg Header Pool Free: 0000000200 / 0000000200
TX/RX Task List Elem Pool Free: 0000000110 / 0000000200
TX Driver List Elem Pool Free: 0000000180 / 0000000180

Task TX List: 0000000000
Drvrx TX List: 0000000000
EmptyRX List: 0000000070
ShelfRX List: 0000000000

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

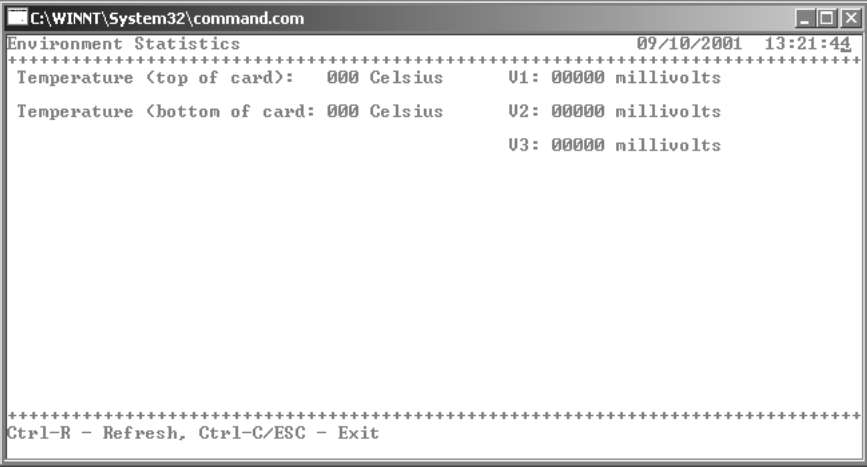
Figure C-12: (B. Statistics, B. Physical Layer Statistics) B. I2C Statistics

```

C:\WINNT\System32\command.com
I2C Statistics                                           09/10/2001 13:20:45
*****
Total TX Packets: 0000934360           TX NAK Errors: 0001296360
Total TX Bytes: 0040177480           TX Underflow Errors: 0000000000
Total RX Packets: 0000000000           TX Collision Errors: 0000000000
Total RX Bytes: 0000000000           RX Overflow Errors: 0000000000

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

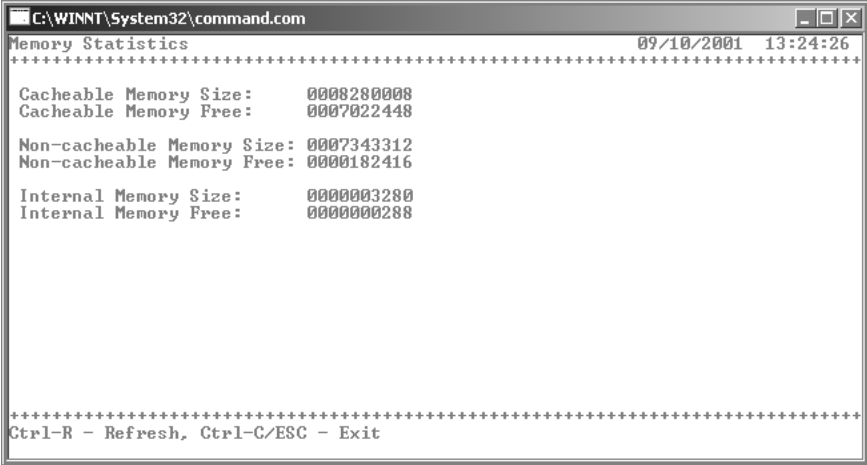
Figure C-13: (B. Statistics) C. Environment Statistics


```

C:\WINNT\System32\command.com
Environment Statistics                                09/10/2001 13:21:44
*****
Temperature (top of card):  000 Celsius      U1: 00000 millivolts
Temperature (bottom of card: 000 Celsius    U2: 00000 millivolts
                                           U3: 00000 millivolts

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

Figure C-14: (B. Statistics) D. System Memory Statistics


```

C:\WINNT\System32\command.com
Memory Statistics                                    09/10/2001 13:24:26
*****
Cacheable Memory Size:      0008280008
Cacheable Memory Free:     0007022448

Non-cacheable Memory Size: 0007343312
Non-cacheable Memory Free: 0000182416

Internal Memory Size:       0000003280
Internal Memory Free:       0000000288

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

Figure C-15: (B. Statistics) E. Shelf Extent Statistics

```

C:\WINNT\System32\command.com
Shelf Extent Statistics                                09/10/2001 13:25:30
*****
Good Extents (Debug): 0000000000    Good Extents (Memory): 0000000008
Good Bytes (Debug): 0000000000      Good Bytes (Memory): 0000000056
Bad Extents (Debug): 0000000000     Bad Extents (Memory): 0000013916
Bad Bytes (Debug): 0000000000       Bad Bytes (Memory): 0000041748

Good Extents (Download): 0000000005  Good Extents (Shelf): 0000000000
Good Bytes (Download): 0000000015    Good Bytes (Shelf): 0000000000
Bad Extents (Download): 0000000000   Bad Extents (Shelf): 0000000000
Bad Bytes (Download): 0000000000     Bad Bytes (Shelf): 0000000000

Good Extents (General): 0000000050
Good Bytes (General): 0000000178
Bad Extents (General): 0000000000
Bad Bytes (General): 0000000000

      Good Extents (All): 0000000063
      Good Bytes (All): 0000000249
      Bad Extents (All): 0000013916    Bad Extents (Unknown): 0000000000
      Bad Bytes (All): 0000041748     Bad Bytes (Unknown): 0000000000
*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

```

Figure C-16: (B. Statistics) F. System Error-Reset Data

```

C:\WINNT\System32\command.com
EXEC Last Alert Data                                09/10/2001 13:26:37
*****
Last Alert:      None
Alert Task:      -----

Alert Calls since last POR : 00000003
RESET events since last POR: 00000003

System UpTime since RESET : 00004d 00h 17m 32s

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit

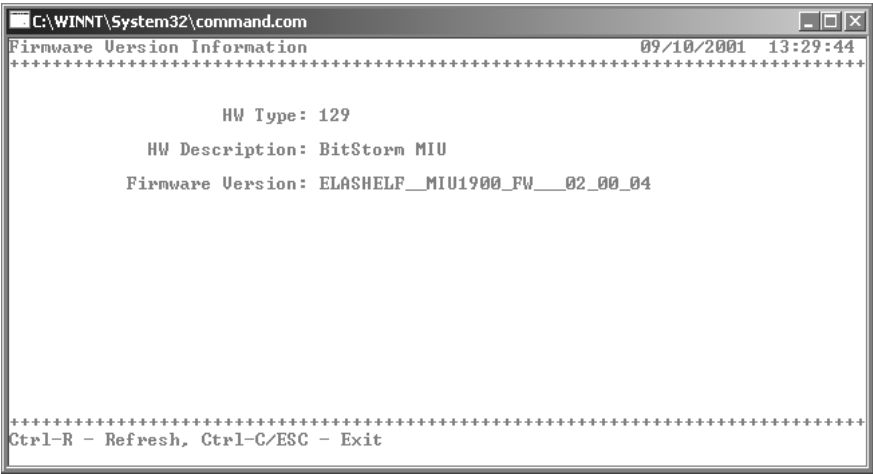
```


Figure C-17: (B. Statistics) G. Modex Daemon Run Statistics

```
C:\WINNT\System32\command.com
Modex Daemon Run Statistics                                09/10/2001 13:28:06
*****
Current Loop Activity Delay State:      0000000000
Current Loop Activity Delay Time (ms):  0000000010
Current Loop Delay Inactive Timeout (ms): 0000004000

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit
```

Firmware Version Information

Figure C-18: C. Firmware Version Information

```
C:\WINNT\System32\command.com
Firmware Version Information                                09/10/2001 13:29:44
*****
HW Type: 129
HW Description: BitStorm MIU
Firmware Version: ELASHELF_MIU1900_FW__02_00_04

*****
Ctrl-R - Refresh, Ctrl-C/ESC - Exit
```

User Account Administration

Figure C-19: D. User Account Administration Menu

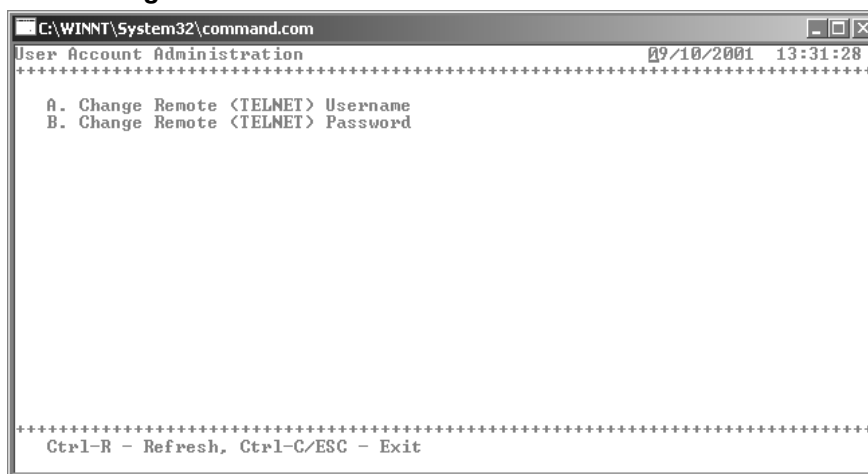


Figure C-20: (D. User Account Administration) A. Change Remote <TELENET> Username



Figure C-21: (D. User Account Administration) B. Change Remote <TELENET> Password

Utilities

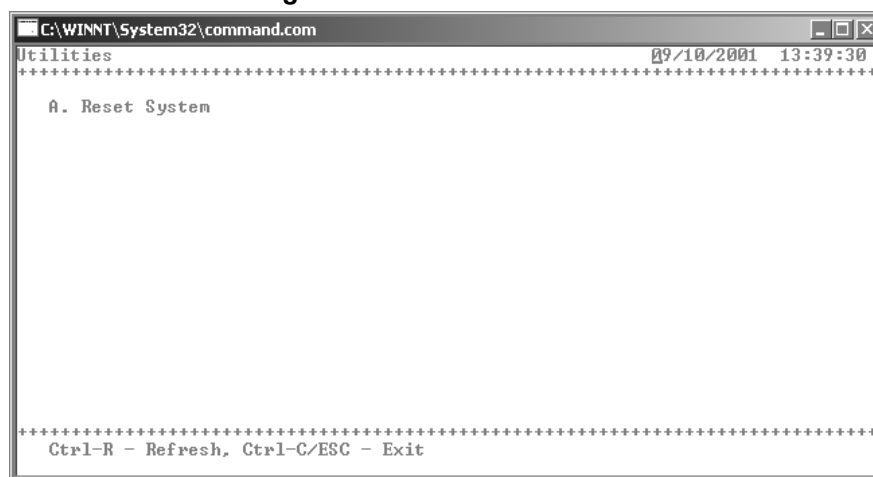
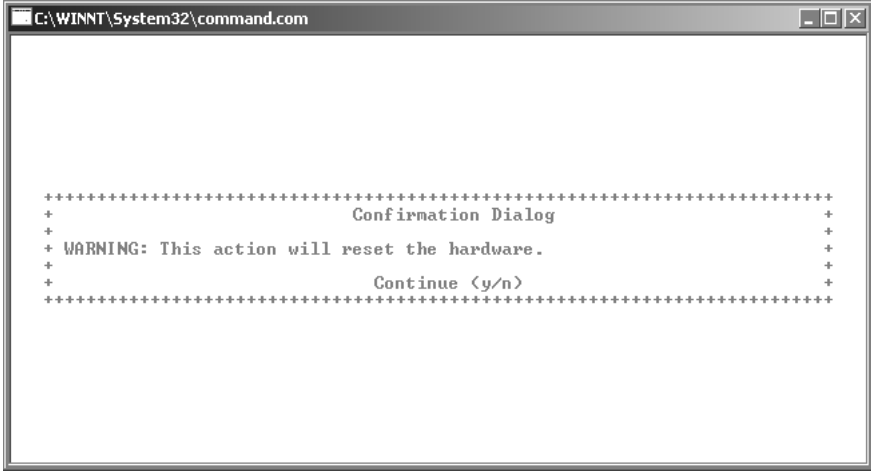
Figure C-22: E. Utilities Menu

Figure C-23: (E. Utilities) A. Reset Confirmation



Appendix D: DoCs

This chapter contains the Declaration of Conformity documentation for the BitStorm 1900 system.

Declaration of Conformity Documentation

96-00020-01-A, **Filter Shelf**, refer to page 204

96-00021-01-C, **Fan Trays**, refer to page 205

96-00022-01-C, **BitStorm 1900 System**, refer to page 206

96-00023-01-A, **StormPort 400/600**, refer to page 207

96-00024-01-A, **StormPort 610**, refer to page 208

96-00032-01-A, **StormPort 1020**, refer to page 209

96-00025-01-A, **Rack-mounted Computer Server**, refer to page 210

96-00020-01-A, DECLARATION OF CONFORMITY, BITSTORM FILTER SHELF**EC Declaration of Conformity**

We,

Elastic Networks Inc.
6120 Windward Parkway, Suite 100
Alpharetta, GA 30005, USA

declare under our sole responsibility that the following described equipment in our delivered version complies with the appropriate essential requirements of the Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Electrical Equipment: Filter Shelf, ITE
Sub-assembly Filter Cards, Model 03-00036-01

Model Number: 03-00029-01,

Applicable EC Directives: R&TTE Directive (99/05/EEC)

Applicable Harmonized Standards: EN 60950:1992 with Amdts. 1,2,3,4 and 11
EN 55022:1998 EN 50082-1:1997
EN 61000-4-2:1995 EN 61000-4-3:1995
EN 61000-4-4:1995 EN 61000-4-6:1997

Year in which CE Marking was affixed: 2001

Authorized Signature/Date:

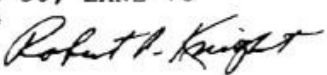
A handwritten signature in black ink, appearing to read 'Tom Acker', written over a horizontal line.

Tom Acker

Title of Signatory:

Vice President Manufacturing

96-00021-01-C, DECLARATION OF CONFORMITY, BITSTORM FAN TRAYS

CE	EU Declaration of Conformity	CE
according to the EMC Directive 89/336/EEC & Low voltage Directive 73/23/EEC, 93/68/EEC		
For the following equipment:		
Product	<u>AC & DC COOLING FAN TRAY</u>	
Type Designation/Trademark	<u>OA600S-DV ORION FANS</u>	
	<u>OD600S-48 ORION FANS</u>	
is herewith confirmed to comply with the requirements set out in the Council Directive 89/336/EEC, 73/23/EEC & 93/68/EEC on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility and Low Voltage Directive. For the evaluation of the compliance with this Directives, the following standards were applied: <u>EN 60950: +A1 +A2 +A3 +A4 +A11</u>		
Responsible for making this declaration is the:		
Manufacturer <input checked="" type="checkbox"/>	Authorized representative established within the EU <input type="checkbox"/>	
Authorized representative established within the EU (if applicable):		
Company Name	:	
Company Address	:	
Person responsible for making this declaration		
Name, Surname	:	<u>ROBERT KNIGHT</u>
Position/Title	:	<u>PRESIDENT</u>
<u>TAIPEI, TAIWAN</u>	<u>4/5/01</u>	<u>KNIGHT ELECTRONICS</u> <u>EA SUITE</u> <u>2ND FL, NO 50, LANE 10</u> <u>TAIPEI 114</u> <u>TAIWAN</u>
(Place)	(Date)	

96-00022-01-C, DECLARATION OF CONFORMITY, BITSTORM SYSTEM**EC Declaration of Conformity**

We,

Elastic Networks Inc.
 6120 Windward Parkway, Suite 100
 Alpharetta, GA 30005, USA

declare under our sole responsibility that the following described equipment in our delivered version complies with the essential requirements of the Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Electrical Equipment: Modem Shelf

Sub-assemblies:

250W DC Power Supply Card, Model 03-00013-XX
 70W AC Power Supply Card, Model 03-00060-XX
 260W DC Power Supply Card, Model 03-00073-XX
 260W AC Power Supply Card, Model 03-00076-XX
 Switch Card, Model 03-00011-XX
 MIU Card, Model 03-00045-XX
 12:1 Modem Card, Model 03-00010-XX
 4212 Modem Card, Model 03-00067-XX
 6306 Modem Card, Model 03-00058-XX
 6224 Modem Card, Model 03-00078-XX
 10306 Modem Card, Model 03-00101-XX
 10224 Modem Card, Model 03-00106-XX

Model Number:

02-00008-XX, 03-00014-XX

Applicable EC Directives:

R&TTE Directive (99/05/EEC)

Applicable Harmonized Standards:

EN 60950:1992 with Amdts. 1,2,3,4 and 11	
EN 50082-1:1997	EN 55022:1998
EN 61000-4-2:1995	EN 61000-4-3:1995
EN 61000-4-4:1995	EN 61000-4-6:1997

Year in which CE Marking was affixed: 2001

A handwritten signature in black ink, appearing to read 'Roger A. Fraser'.

Authorized Signature

 Roger Fraser

Title of Signatory:

Director, Product Line Management

96-00023-01-A, DECLARATION OF CONFORMITY, STORMPORT 400/600**EC Declaration of Conformity**

We,

Elastic Networks Inc.
6120 Windward Parkway, Suite 100
Alpharetta, GA 30005, USA

declare under our sole responsibility that the following described equipment in our delivered version complies with the appropriate essential requirements of the Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Electrical Equipment: StormPort 400 and 600 CPE Modem

Model Number: 02-00037-XX and 02-00077-XX

Applicable EC Directives: R&TTE Directive (99/05/EEC)

Applicable Harmonized Standards:

EN 60950:1992	with Amdts. 1,2,3,4 and 11
EN 55022:1994	EN 55024:1998
EN 61000-3-2:1995	EN 61000-3-3:1995
EN 61000-4-2:1995	EN 61000-4-3:1995
EN 61000-4-4:1995	EN 61000-4-5:1995
EN 61000-4-6:1997	EN 61000-4-11:1994

Year in which CE Marking was affixed: 2000

Authorized Signature/Date:

A handwritten signature in black ink, appearing to read 'Tom Acker', written over a horizontal line.

Tom Acker

Title of Signatory:

Vice President Manufacturing

96-00024-01-A, DECLARATION OF CONFORMITY, STORMPORT 610**EC Declaration of Conformity**

We,

Elastic Networks Inc.
6120 Windward Parkway, Suite 100
Alpharetta, GA 30005, USA

declare under our sole responsibility that the following described equipment in our delivered version complies with the appropriate essential requirements of the Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Electrical Equipment: StormPort 610 CPE Modem

Model Number: 02-00071-XX

Applicable EC Directives: EC R&TTE Directive (99/05/EEC)

Applicable Harmonized Standards:

EN 60950:1992 with Amdts. 1,2,3,4 and 11	
EN 55022:1994	EN 55024:1998
EN 61000-3-2:1995	EN 61000-3-3:1995
EN 61000-4-2:1995	EN 61000-4-3:1995
EN 61000-4-4:1995	EN 61000-4-5:1995
EN 61000-4-6:1997	EN 61000-4-11:1994

Year in which CE Marking was affixed: 2001

Authorized Signature/Date:

A handwritten signature in black ink, appearing to read 'Tom Acker', written over a horizontal line.

Tom Acker

Title of Signatory:

Vice President Manufacturing

96-00032-01-A, DECLARATION OF CONFORMITY, STORMPORT 1020**EC Declaration of Conformity**

We,

Elastic Networks Inc.
6120 Windward Parkway, Suite 100
Alpharetta, GA 30005, USA

declare under our sole responsibility that the following described equipment in our delivered version complies with the appropriate essential requirements of the Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Description of the Electrical Equipment: StormPort 1020 CPE Modem

Model Number: 02-00100-XX

Applicable EC Directives: EC R&TTE Directive (99/05/EEC)

Applicable Harmonized Standards:

EN 60950:1992 with Amdts. 1,2,3,4 and 11	
EN 55022:1994	EN 55024:1998
EN 61000-3-2:1995	EN 61000-3-3:1995
EN 61000-4-2:1995	EN 61000-4-3:1995
EN 61000-4-4:1995	EN 61000-4-5:1995
EN 61000-4-6:1997	EN 61000-4-11:1994

Year in which CE Marking was affixed: 2001

A handwritten signature in black ink, appearing to read 'Roger A. Fraser'.

Authorized Signature

Roger Fraser

Title of Signatory:

Director Product Line Management

Date:

September 27, 2001

96-00032-01 Rev A

96-00025-01-A, DECLARATION OF CONFORMITY, RACK-MOUNTED COMPUTER SERVER**DECLARATION OF CONFORMITY**Application of Council Directive(s) 73/23/EECLow Voltage Directive

Standard(s) to which Conformity is Declared

IEC 950: +A1, 1992: +A2, 1993: +A3, 1995:
+A4, 1996

Manufacturers Name Penguin Computing
965 Mission Street
San Francisco, CA 94103

Manufacturers Address Nextrend Technology
47560 Seabridge Drive
Fremont, CA 94538

Importer's Name _____

Importer's Address _____

Type of Equipment Commercial Rack-mounted Computer Server


Model No. 1Urackmount

Serial No. _____

Year of Manufacture 2000

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place _____


(Signature)

Date _____

Steven McDowell
(Full name)Director of Engineering
(Position)

96-00025-01-A, DECLARATION OF CONFORMITY, RACK-MOUNTED COMPUTER SERVER, PAGE 2

Aufbau-Übersicht für Elektrogeräte Constructional Data Form for Electrical Appliances			
Antragsteller/Applicant:	Penguin Computing		Revised: 05/01/2001
Fertigungsstätte/Factory:	Nextrend Technology		
Geräteart/Kind of Equip.:	Commercial Computer Server		
Typenbezeichnung/Designation:	Model No. 1Urackmount		
Nennspannung/Rated Voltage:	115/230 Vac, 50/60 Hz.		
Nennstrom/Rated Input Power:	5.0A.		
Schutzklasse/Protection Class:	Schutzklasse I (Schutzleiteranschluß, class I (PE-connection),		
Schutzart/Moisture Protection:	abgedeckte, tropfwassergeschützte, Ordinary		
Anschlußmittel/Supply Conn.:	Gerätesteckvorrichtung. Appliance inlet.		
<p>Sonstige Angaben (z. B. KB, AB, Betriebsdauer, Nenninhalt, Betriebsüberdruck, Werkstoffe usw.): Siehe Rückseite</p> <p>Additional information (e.g. short time operation, duration of operation, rated pressure, construction material etc.): See reverse</p>			
<p>Im Gerät eingebaute Einzelteile: (Schalter, Temperaturregler, Heizkörper, Stecker, Leitungen usw.) Für eingebaute Motoren und sonstige Wicklungen z. B. Transformatoren, Magnetspuilen usw., bitte Rückseite ausfüllen.</p> <p>Built in components: (switch, temperature regulator, heater, plug, wire, capacitor, socket etc.) Complete table below.</p> <p>For built in motors and other components with windings e.g. transformers, coils etc. please fill out last page.</p>			
Art kind of component	Hersteller manufacturer	Angaben über Typ, Stromstärke, Leistung o.a. information about type, current, power etc.	Prüfzeichen test mark
Supply Cord	Any	Rated, 300V, <HAR>	Any
Appliance Inlet	Kema Keur, SC-8	Rated: 10A, 250 VAC	VDE, N, FI
Power Supply	Zippy Technology Corp, Model MPW-6150F	Rated: Input 95-135 VAC, or 180-265 VAC, 47-63Hz, 5.0A for 115 VAC, and 2.5A for 230 VAC. Output: 3.3V @ 6A, 5V @ 10A, 12V @ 6A, -12V @ 1.0A, -5V @ 0.2A, +5VSB @ 720ma	RU, CSA, VDE, CE
Printed Wiring Boards	Any	Minimum Flame rating of 94V-0	
Hard Drive	Quantum, Fireball Plus	Rated: 12V @ 700mA, 5V @ 600mA	TUV, CRU, RU, CE
Cooling Fans X (3)	Sparkle Power Inc, ADO412HB-C50	Rated: 12V @ 0.1A	TUV, CRU, RU, CE
CD ROM Drive	Toshiba, XM-6702B CD ROM	Rated: 12V, or 5V	RU, CSA
*Floppy Disk Drive	Sony, MP-F920	Rated: 5V @ 1.5W	Any
Lithium Battery	Maxell, CR2032	Rated: 3V	Any

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Elastic Networks

BitStorm 1900™ Access Multiplexer Installation and Maintenance Guide

Installation and Testing Guide

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BitStorm 1900™ Access Multiplexer

Installation and Maintenance Guide

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